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NEWSLETTER IN CENTER FOLD

U. S. DEPARTMENT OF COMMERCE
OFFICE OF TECHNICAL SERVICES

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UNITED STATES DEPARTMENT OF COMMERCE

Charles Sawyer, Secretary

OFFICE OF TECHNICAL SERVICES

John C. Green, Director

August 1951

METHYL ALCOHOL IS UTILIZED IN A NEW SOIL SELECTION TECHNIQUE WHICH PROVIDES ECONOMY IN INITIAL STAGES OF CONSTRUCTION

A soil selection method which will enable contractors to save valuable time in construction of highways, air field pavements, earthen dams, and other earth utilizing structures has been developed in research of the Texas Engineering Experiment Station. The new method employs methyl alcohol, which has the property of rapid evaporation, to break down the bond between soil particles.

The old established methods are based on standard soil tests which requires up to three days for completion, particularly in the case of fine grain soils such as clays. The one most used by laboratories conforms reasonably well with the standard ASTM D 421-39, with some slight modifications by local preference. It begins with air drying of the sample, breaking up the large aggregations, and quartering to obtain a representative sample. Following this, the sample is separated on a 10-mesh sieve. The sample is then washed through the sieve, and the soil grains and water which pass the sieve are retained for use in determining the physical soil constants. The minus-40 soil or binder is separated from its wash water by evaporation. This may require up to 72 hours or more, depending upon the copiousness of the water, the room temperature and humidity, the velocity of air over the drying pan, and other minor factors. The sieving operation also may require many hours, particularly when separating fine grained soils. Clays do not slake readily with water, and as much as 24 hours time may be required to slake the soil prior to sieving. This time consuming, multi-step separation process causes objectionable delays, particularly in the field. During such delays, the construction contractor must busy himself at other tasks, or continue to use a material which is not known assuredly to be suitable, with the possible consequence of later removing this material from the job and replacing it with satisfactory soil. Oftentimes a situation of false economy occurs by accepting the unsuitable material rather than requiring its removal.

The methyl alcohol soil selection method developed in the Texas Engineering Station's research is based on a rapid soil moisture test which was described in its Research Report No. 9 "A Rapid Method for Determining the Moisture Content of Soils"

by Albert J. Bonar, reproductions of which are available from the Office of Technical Services, U. S. Department of Commerce. Developed primarily for field use, it accomplishes in minutes at the construction site that testing which would otherwise require days of time at a laboratory. In addition to a supply of methyl alcohol, it requires basically the same equipment as the ASTM method: No. 40-mesh sieve, 3-quart sauce pan, liter beaker, spatula, small trowel, 10" x 15" metal cookie baking sheet, gas or electric hot plate, and a short length of small diameter rubber hose.

Procedure of the alcohol soil selection method is simple and does not call for specialized attention. A representative test soil sample is taken by quartering or use of a sample splitter. It is placed on the sieve which in turn rests on the bottom of the sauce pan. A liter of methyl alcohol is poured slowly over the soil, and the mixture is agitated until the binder has slaked and passed through the sieve. The sieve is raised from the bottom of the pan to allow draining. The pan is tilted for a few minutes to enable the binder which has collected in it to settle on one side. About half of the alcohol water mixture from the pan is siphoned into a beaker. The material on the sieve is rewashed with the siphoned mixture until a reasonably clear wash is obtained. After final siphoning, the remaining soil-alcohol-water mixture is then poured onto a cookie sheet and placed over a hot plate. The soil sample is then stirred until it is dry. The previously siphoned alcohol is filtered through paper, and the soil remaining is dried and added to the dry soil sample on the cookie sheet.

A variety of typical soils were tested by both the established method and the alcohol method. These gave favorable evidence for the alcohol method with regard to separation and drying. The effect of alcohol separation on the Atterberg Limits is negligible, and no trend is indicated.

The experimentation on the new soil selection method was conducted under supervision of Prof. Spencer J. Buchanan. A detailed account of it is given in Research Report No. 20 "Rapid Sample Preparation Method for Soil Selection in Earthwork Construction" by Bob M. Gallaway. Copies may be obtained from the Texas Engineering Experiment Station.

Submitted by Louis J. Horn
Supervisor of Publications
Texas Engineering Experiment Station
Texas A. and M. College System, College Station

APPAREL

INVESTIGATION OF FIRE-FIGHTING SUIT MATERIALS, by J. I. Wittebort. U. S. Air Materiel Command. Engineering Division. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. May 1948. 15p graphs, tables Mi $1.75, Ph $2.50. PB 104167

The relative efficiencies of various materials with respect to their application as radiation barriers in fire-fighting suits were investigated in an effort to develop an improved fire-fighting suit capable of withstanding 2000°F for 3 min. The relative reflectance of metals for infrared radiation and the relative diffuse reflectance of various materials to radiations of 0.4-3.5 mu were measured as well as the total emissivities of metals and the radiation intensities from silver and aluminum foils at various temperatures. It was concluded that silver foil has the best over-all radiation-barrier characteristics of the common metals. It has a high total reflectance, low emissivity, a melting point of 1761°F and retains its reflectance properties to at least 1500°F. Aluminum foil showed itself to be a possible radiation-barrier material for fire-fighting suits operating at less than 1000°F. AAF TSEAM MR 666-1E.

QUALIFICATION TEST OF DRYBAK SAMPLE OF SUIT, FLYING, PNEUMATIC, ANTI-G TYPE, G-4A AS PER MIL-S-6544 (USAF) DATED 28 DEC 1950, by E. E. Martin. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Mar 1951. 3p Mi $1.25, Ph $1.25. PB 103771

1. Suits, Flying - Pneumatic - Tests 2. G-4A (Flying suit) 3. Drybak Co., Binghamton, N. Y. 4. AAF TSEAA 689-4K.

CHEMICAL AND ALLIED PRODUCTS

Detergents

RECLAIMING DRY CLEANING SOLVENTS, A LITERATURE AND PATENT SURVEY, PREPARED by Robert L. Martin. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Laboratories. Technical Library. Dec 1950. 39p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Mimeo: $1.00. PB 103939

The bibliography presented is essentially a periodical and patent literature survey covering methods of purifying contaminated dry cleaning solvents. References pertaining to apparatus used in the purification process are also included. The arrangement of the abstracts is chronological. A further breakdown within the chronological framework is as follows: the literature references are arranged alphabetically according to author and precede the patent citations. The scope of the survey covers the period 1925 through mid-year 1950. Where the primary source of information was not available for checking, a secondary source was consulted, chiefly Chemical Abstracts. A "name index" of authors and inventors, and a "patent index" are appended. QMC TL BS 16.

Plastics and Plasticizers

BEHAVIOUR OF PLASTICS AT LOW TEMPERATURES REPORT NO. 2, by N.J.L. Megson. Gt. Brit. Ministry of Supply. Directorate of Materials and Explosives Research and Development. Advisory Service on Plastics and Rubber. Apr 1950. 19p tables (2 fold) Mi $1.75, Ph $2.50. PB 104138

A literature survey was made of the low-temperature characteristics of plastics. The tests performed and the range of temperatures covered by tests of thermoplastics and thermosetting materials are tabulated. The tests included tensile, flexural, compression, shear and impact strengths, maximum fiber stress, elongation, stiffness, and modulus of elasticity. Changes in properties with decreasing temperature are shown by comparing values measured at room temperature and at low temperatures. The characteristics of specific plastics are discussed, and further tests needed to supplement existing data recommended. MX4/Report/2. File Ref. 7/Plastics/24.

DEVELOPMENT AND TEST OF LOW-PRESSURE MOLDED GLASS FABRIC BASE SILICONE PLASTIC LAMINATES, by George E. Power. U. S. Air Materiel Command. Engineering Division. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1949. 57p photos, graphs, tables Mi $2.75, Ph $7.50. PB 104161

An investigation was made to determine whether laminates could be made from glass fabric and silicone resins at 15 psi using commercially available materials. Although such laminates can be made in the laboratory, they could not be produced successfully on a commercial scale due to inherent limitations in the flow characteristics of silicone resins. Tests were made on sample laminates at room temperature, 200,400,450,500, and 600°F to determine their mechanical properties. The results indicated that low pressure silicone glass fabric base laminates are essentially unaffected by the length of exposure time up to 200 hours up to a temperature of 500°F. The flexural strength decreases considerably as the temperature increases. Recently available silicone resins show promise of great improvement in laminating characteristics and strength at elevated temperatures. Prepared by the Formica Company under Air Force Contract no. W-33-038-ac-19948. AAF TR 5941.

HEAT RESISTANT TESTS ON STRUCTURAL PLASTICS, by C. R. Lemons and E. Mooring. Douglas Aircraft Company, Inc., Santa Monica, Cal. May 1950. 40p drawings, graphs, tables Mi $2.25, Ph $5.00. PB 104144

An investigation was made to obtain preliminary design data on Fiberglas laminates at room and elevated temperatures (from 250° to 400°F) for use in structural and nonstructural applications such as stabilizer tips, radomes, stiffener angles, insulation panels, and air ducts in high-speed aircraft. The investigation was intended to determine the highest-heat-resistant resins available with which to impregnate Fiberglas cloth for structural laminates and to determine proper curing and heat-treating techniques. The resins tested were all applicable to conventional molding and fabricating techniques currently employed with low-pressure phenolic and polyester resin laminated plastic parts. Conolon (nylon-phenolic) had the highest flexural strength values at temperature of

all resins tested. Selectron 5016 and Plaskon 911-11 (polyester) had very similar flexural strength values up to 400°F. Report no. Dev-523.

INVESTIGATION OF THE STRUCTURE OF PHENOLIC RESINS. PART VI: MELTING POINTS OF MIXTURES OF THE ISOMERIC DIHYDROXY DIPHENYL METHANES, by S. R. Finn and G. J. Lewis. Gt. Brit. Chemical Defense and Experimental Station. Dec 1949. 9p Mi $1.25, Ph $1.25. PB 104152

The melting points of the three component system, consisting of the isomeric o-o, o-p' and p-p' dihydroxy diphenyl methanes, were investigated. The minimum melting point obtained was in the 80°C region. All the mixtures of the three isomers crystallized within a few hours on cooling after fusion and they do not resemble the novolaks (simple resins of the phenol-formaldehyde type) which do not crystallize on standing for very long periods. This suggests that the simple novolaks are constituents of other than the diphenyl methane structure. The preparation of a new trinuclear compound of this type from phenol is also described. Appendix A. Preparation of the trinuclear compound III (1 hydroxy 2:6 Bis (Hydroxy benzyl) benzene IV. Summary of Dorton Technical Paper no. 145.

PLASTIC COLLAPSE AND SHAKE-DOWN THEOREMS FOR STRUCTURES OF STRAIN HARDENING MATERIAL, by B. G. Neal. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Sep 1949. 52f diagrs Mi $2.75, Enl Pr $8.75. PB 104192

The principles of plastic collapse and the shake-down theorems are outlined for structures of strain hardening material. The truss problem is considered for this purpose, due to its greater mathematical simplicity. The proof of the shake-down theorem is presented, and the application of the shake-down and collapse theorems to a model for strain hardening and to frame structures is discussed. While the theorems enable load-carrying capacity of structures to be investigated, and important question remains unanswered. For instance, a structure while still theoretically capable of carrying further load, might become practically useless due to excessive deformations of some of its members. Therefore, it would be desirable to be able to calculate an upper limit on the deformations of a member under these conditions. Contract no. N7onr-358, T.O. I, no. 041-032 A11-40/36. GDAM TR40.

STUDIES OF THE STRUCTURE AND PROPERTIES OF POLYMERS BY THE USE OF BIREFRINGENCE, by R. S. Stein and A. V. Tobolsky. Princeton University. Plastics Laboratory. Jun 1950. 127p diagrs, graphs, tables Mi $5.00, Ph $16.25. PB 103978

Structure and properties of polymers were studied using birefringence as a measure of the optical anisotropy of these compounds. Optical properties of a material can be defined by specifying the refractive indices for light waves with their electrostatic components varying along three perpendicular directions through the material known as principal as principal axes. The molecular theory of birefringence is explained. Birefringence along a given axis is the difference between refractive indices along two principal axes perpendicular to the direction of the axis along which light travels. Direct and interference-phenomena involving methods for the measurement of birefringence are described. The relationship between refractive index and polarizability of the atoms is discussed and it is shown how the birefringence contributions of the crystalline and amorphous regions of a polymer can be calculated to obtain the total polarizability of the material. Contract no. W-36-039-sc-32011. Dept. of the Army project: 3-99-15-022. Signal Corps project: 152B. PU PL 18A.

Paints, Varnishes and Lacquers

GUMMIMETALLVERBINDUNG ARBEITSANWENDUNG (RUBBER-METAL FUSION). Entwicklungs Gesellschaft m.b.H., Querum, Ger. n.d. 3f diagrs (Text in German) Mi $1.25, Enl Pr $1.50. PB 103834

1. Adhesives, Rubber-to-metal - Germany
2. Micro NAVSHIPS M683-46.

SURFACE FINISHES FOR HOUSEHOLD APPLIANCES (METALLIC FINISHES, ALUMINUM IN BUILDING WORK, HARDNESS OF PAINT, ETC.). Deutscher Normenasschuss E. V. Fach-Kommission Oberflächengestaltung von Haushaltgeräten. 1946. 525f drawings, diagrs, tables (Text in German) Mi $9.00 Enl Pr $70.00. PB 103862

1. Domestic appliances - Surface finishes - Germany 2. Metals - Surface finishes - Germany 3. Aluminum - Use in building - Germany 4. Paints - Standards - Germany 5. Micro BIOS FD 2941/48, Frames unnumbered.

Abstract available as PB 103862s. 2p. Mi $1.25, Ph $1.25. Contents: 19.01. Summary of work of the commission. - 19.02. Appendix (tables, etc.) to 19.01.-19.03. Household appliances and their surface treatment. -19.04. Surface treatment of metals. - 19.05. Bibliography. - 19.15. Investigation of hardness of paint. - 19.16. Aluminum in architecture (With bibliography).

Miscellaneous Chemicals

ZETKO AUSTAUSCH, 1940 UND 1944 (REPORTS OF THE INTERMEDIATE PRODUCTS COMMISSION. I. G. Farbenindustrie A. G., Frankfort, Ger. 1940-1944. 40f (Text in German) Mi $2.50, Enl Pr $7.50. PB 103757

1. Chemical research - Germany 2. Dyes and dyeing - Research - Germany 3. Pyran, Dihydro - Germany 4. Pyran, Tetrahydro - Germany 5. Ethers Aninodiphenyl - Germany 6. Lactones - Reactions - Germany 7. Diazo compounds - Germany 8. Phenothiazine - Production - Germany 9. Arsenic acids - Production - Germany 10. Acrylic acid, Amino - Reactions - Germany 11. Ketones, Hydroxyaryl - esters - Germany 12. Acetals, Nitro - Germany 13. Ketones, Imino - Esters - Germany 14. ZETKO (Zwischenprodukt-Kommission) 15. Micro BIOS DOCS 2351/2247/5 16. Micro BIOS FD 4083/47, Frames 1-31.

English abstract included (last page missing). The following papers were presented at the 1944 conference: Umsetzungen mit acrylsäureamid (Reactions of acrylacid amine) by Kunze. - Umsetzungen von laktonen mit alkalimetallen (Reactions of lactones with alkali metals) by Korten. - Nitroacetale (Nitroacetal) by Nonold. - Über ein neues verfahren zum ersatz der diazogruppe durch wasser stoff (New process for substitution of the diazo group by hydrogen) by Schubert and Fleischbauer. - Oxyarylketone

und deren aether (Oxyaryl ketones and their ethers) by Brunner. - Überraschende bilding von iminoäthern in alkalischem medium (Surprising formation of imino esters in alkaline medium) by Ritter. - Secundäre aralkylarsinsäuren (Secondary aralkyl arsenic acids) by Fleischbauer. - Technische herstellung von thiodiphenylamin (Technical production of thiodiphenylamine) by Ferreau.

ZETKO AUSTAUCH 1940, 1944 (REPORTS OF THE INTERMEDIATE PRODUCTS COMMISSION. I. G. Farbenindustrie A. G., Griesheim, Ger. 1940-1944. 22f (Text in German) Mi $2.00, Enl Pr $5.00.
PB 103754

1. Acetic acid, Chlorophenoxy- Derivatives - Germany 2. Benzene, Dinitro thiocyano-By-products - Germany 3. Urea, Thio - Determination - Germany 4. Ammonium thiocynate - Thio urea content - Germany 5. Polysulfides - Germany 6. Naphthalene, 1-Chloro - Derivatives - Germany 7. Naphthalene, 1-Chloro - Effect of chlorosulfonic acid - Germany 8. Benzenesulfonic acid, m-Nitro - Esters - Germany 9. Benzenesulfonic acid, p-Nitro - Esters - Germany 10. Phenol, o-Amino - Germany 11. Resins, Cumarone - Production - Germany 12. ZETKO (Zwischenprodukt-Kommission) 13. Micro BIOS DOCS 2351/2247/5 14. Micro BIOS FD 4078/47, Frames 1-15.

Abstract available as PB 103754s. 1p. Mi $1.25, Ph $1.25. Contents: 1944. Chlorierte Phenoxyessigsäuren und derivate (Chlorinated phenoxyacetic acid and derivatives) by Wolf. - Nebenprodukte in der dinitro-rhodanbenzol-fabrikation (By-products in the manufacture of dinitro-sulphocyanide benzol), by Wolf. - Untersuchungen über die bestimmung von thioharnstoff im rhodanammonium (Investigations relating to the determination of thio urea in ammonium thiocyanate) by E. Fiala. - Über einige polysulfide (On some polysulfides) by Wolf. - Über die einwirkung von chlorsulfosäure auf a-chlorinaphtalin (On the effects of chlorosulphonic acid on alpha-chloronaphtalene) by Klarmann. - Über abwnaglungsprodukte aus a-chlornaphtalin (Derivatives from alpha-chloronaphtalene) by Hasenkamp. - Über die darstellung höhrerer alipatischer ester der m-und p-nitrobenzolsulfosäure (On the production of higher aliphatic esters of the m- and p-nitrobenzenesulphonic acid) by Klarmann. - 1940 meeting: Nitrosubstituierte o-aminophenole (Nitro-substituted o-amino-phenols) by Dr. Weissbach. - Anreicherung und gewinnung des cumarons aus schwerbenzol (Enriching and preparation of cumarone resin from heavy benzene) by Dr. Klarmann. - Darstellung von aethersäuren aus Leuna-alkohol (Preparation of ether acid from Leuna alcohol) by Drs. Engelberts and Fiala.

ZETKO AUSTAUSCH 1940 UND 1944 (REPORTS OF THE INTERMEDIATE PRODUCTS COMMISSION). I.G. Farbenindustrie A. G., Höchst, Ger. 1940-1946. 90f drawing, graph, tables (Text in German) Mi $3.75, Enl Pr $12.50.
PB 103752

1. Chemical research - Germany 2. Dyes and dyeing - Research - Germany 3. Methane, Brominochloro - Production - Germany 4. Fire extinguishers, Bromochloromethane - Germany 5. Starch - Hydrolysis - Germany 6. Diketene - Production - Germany 7. Dyes, Anthraquinone - Germany 8. Terpenes - Preparation - Germany 9. Fluorine - Determination - Germany 10. Glycol - Esters - Preparation - Germany 11. GB (Trade name) 12. Xanthic acid - Ethyl ester - Preparation - Germany 13. Carbazole - Synthesis - Germany 14. Methacrylic acid - Production - Germany 15. Dimethylsulfate - Chlorination - Germany 16. Salicylic acid, 4,5-Diamino - Germany 17. Pyridine, 2-Phenyl-3-oxy - Germany 18. ZETKO (Zwischenprodukt-Kommission) 19. Micro BIOS DOCS 2351/2247/5 20. Micro BIOS FD 4076/47, Frames 1-57.

English abstract included. Abstract available as PB 103752s. 4p. Mi $1.25, Ph $1.25. Contents: XIV austausch. 1940: Herstellung von chlor-brommethan aus methylenchlorid, aluminium und brom (Production of bromine chloride methane from methylene chloride, aluminum and bromine) by Dr. Dachlauer. - Über feuerlösversuche mit chlorbrommethanen und halogenkohlenwasserstoffen (Fire extinguishing properties of bromine chloride methanes and hydrogen halides) by Dr. Dachlauer. - Über die chlorierung von dimethylsulfat (On the chlorination of dimethylsulphate) by Drs. Petri and Dachlauer. - Starkehydrolyse mit hilfe von kohlendioxyd (Hydrolysis of starch with the help of carbon dioxide) by Dr. Wolfram. - Diketen und seine verwertung (Diketene and its applications) by Dr. Nicodemus. - Darstellung von 4.5-diaminosalicyl-säure (Production of 4.5 diamino-salicylic acid) by Dr. Waldmüller. - Trifluormethyl gruppen enthaltende anthrachinone (Anthraquinones containing trifluormethyl groups) by Dr. Scherer. - Neue arbeite auf dem turpingebiet (New developments in the field of terpenes) by Dr. Heisel. - XVIII austausch, 1944: Fluorhaltige aethylene (Fluorine bearing ethylenes) by Scherer. - Neue wege zur herstellung von chlorbrom-methan (New methods in production of bromine chloride methane) by Petri. - Nachweis und ausfällung von polyglykoläthern (Detection and precipitation of polyglycol ethers) by Thomsen. - Herstellung von gerbstoff GB (Production of tanning agent GB) by Thomsen. - Neue kondensationsprodukte auf basis xanthogenaten (New condensation products based on xanthogenates) by Mack. - Über umsetzungsprodukte des penta-nitro carbazols (On reaction products of pentanitrocarbazoles) by Langbein I. - Über eine verbesserte Täuberische carbazolsynthese (Improved Täuber's carbazole synthesis) by Leditschke. - 2-phenyl-1-3-oxy-pyridine (2-phenyl-3-oxy-pyridine) by Leditschke. - Substituierte n-phenyl-pyrrol-aldehyde aus furol (Substituted n-phenyl-pyrrole-aldehydes from furol) by Leditschke. - Zur darstellung der methacrylsäure (Synthesis of methacrylic acid) by Wilke.

ZETKO AUSTAUSCH, 1940 UND 1944 (REPORTS OF THE INTERMEDIATE PRODUCTS COMMISSION). I.G. Farbenindustrie A. G., Offenbach, Ger. 1940-1944. 21f (Text in German) Mi $2.00, Enl Pr $5.00.
PB 103756

1. Dyes, Naphthol AS 2. Nitriles - Germany 3. 1.2.5 Pentanetriol - Production - Germany 4. Cyanogen - Germany 5. Acetic acid, Phenoxy - Germany 6. Iganil (Trade name) 7. ZETKO (Zwischenprodukt-Kommission) 8. Micro BIOS DOCS 2351/2247/5 9. Micro BIOS FD 4082/47, Frames 1-18.

English abstract included. Abstract available as PB 103756s. 2p. Mi $1.25, Ph $1.25. Contents: 1940. Arbeiten zur herstellung von naphthol AS unter einsparung von toluol und phosphortrichlorid (Work on production of naphthol AS with a saving in toluol and phosphorus trichloride. - Herstullung aromatischer nitrilover bindungen (Production of aromatic nitrile compounds). - Apr 1944. Herstellung von

pentantriol 1.2.5 (Production of pentane triol 1.2.5).- Cyangruppenhaltige ester (Esters containing cyanogen groups). - Veresterung von phenoxyessigsäure-formaldehyd-harz (Esterifying phenoxy acetic acid formaldehyde resin). - Salze von aryloxyessigsaure-formaldehyd-harzen (Salts from aryloxy acetic acid formaldehyde resin). - Iganil mit hohen mechanischen festigkeiten (Iganil with high mechanical strength).

ZETKO AUSTAUSCH, 1940 UND 1944 (REPORTS OF THE INTERMEDIATE PRODUCTS COMMISSION) I.G. Farbenindustrie A. G., Uerdingen, Ger. 1940-1944. 30f (Text in German) Mi $2.00, Enl Pr $5.00.

PB 103755

1. Chemical research - Germany 2. Triphenylamine - Production - Germany 3. Oils and fats - Antioxidants - Germany 4. Sulfuryl amide - Production - Germany 5. Phenol, Pentachloro - Production - Germany 6. Naphthalene - Chlorination - Germany 7. Amines, Diaryl - Preparation - Germany 8. Carbonic acid, Diethyl ester - Production - Germany 9. Catechols - Synthesis - Germany 10. Methane mixtures - Germany 11. ZETKO (Zwischenprodukt-Kommission) 12. Micro BIOS DOCS 2351/2247/5 13. Micro BIOS FD 4079/47, Frames 1-22.

English abstract included. Abstract available as PB 103755s. 2p. Mi $1.25, Ph $1.25. Contents: XIV austausch, 1940: Darstellung von triphenylamin (Preparation of triphenylamine) by Dr. Mittag. - Über neue antioxydantien zur konservierung von fetten und ölen (New antioxidisers for preservation of fats and oils) by Dr. Pinkernelle. - XVIII austausch, 1944: Über substituierte sulfurylamide II (On substituted sulphuryl amide II) by Vollmann and Geilenkirchen. - Arbeiten über hochchlorierte aromaten V: Pentachlorthiophenol und thioäther aus hexachlorbenzol (Work on highly chlorinated aromatic compounds V: Pentachlorthiophenol and thioether from hexachlorobenzol) by Vollmann and Giltges. - Über die Perchlorieren von naphtalin (Perchlorenation of naphthalene) by Vollmann - Über die alkylierung von diarylaminen mittels ungesättigter kohlenwasserstoff (Alkylation of diaryl amines by means of unsaturated hydrocarbons) by Binapfl. - Einigte kohlensäure-ester (Some carbonic acid esters) by Kimpel. - Herstellung von arylcarbonaten aus brenzchin und aus einwertigen pholen ohne säurebindenen mittel (Production of aryl carbonates from catechol and from monovalent phenols with phosgene without acid binding mediums) by Vollmann and Giltges.

ZETKO AUSTAUSCH 1940 UND 1944 (REPORTS OF THE INTERMEDIATE PRODUCTS COMMISSION) I.G. Farbenindustrie A. G., Wolfen, Ger. 1940-1944. 63f (Text in German) Mi $3.00, Enl Pr $10.00.

PB 103753

1. Chemical research - Germany 2. Acetaldehyde disulfonic acid - Germany 3. Sulfonic acids, Amino - Germany 4. Sulfinic acids, Amino - Germany 5. Tanning materials - Germany 6. Wofatit process - Germany 7. Vanillin - Preparation - Germany 8. Sulfite liquor, Waste - Vanillin recovery - Germany 9. Yeast, Food - Production - Germany 10. Furan - Derivatives - Reactions - Germany 11. 2-Furaldehyde - Derivatives - Preparation - Germany 12. Phenols, Amino - Alkyl derivatives - Germany 13. Sulfochlorides - Production - Germany 14. Peroxides - Uses - Germany 15. Vanillose - Preparation - Germany 16. Sulfones - Preparation - Germany 17. Cartridges, Pyrotechnic - Germany 18. Micro BIOS DOCS 2351/2247/5 19. Micro BIOS FD 4077/47, Frames 1-39.

English abstract included. Abstract available as PB 103753s. 3p. Mi $1.25, Ph $1.25. Contents: XIV austausch, 1940: Über acetaldehyd-disulfosäure (On acetaldehyde disulfonic acid) by Dr. Wesche. - Über substitutierte aminosulfonsäuren und aminosulfinsäuren (On substituted amino sulfonic acids and amino sulfinic acids) by Wesche. - Über die herstellung von austauschgerbstoffen aus ligninsulfosäuren-calcium (Production of substitute tanning materials from lignin sulfo acid calcium) by Rudolph and Mathauser. - Über die herstellung von aschearmen, bzw.aschefreien, eisenfreien und mineralsäurefreien gerbmittel durch anwendung des Wofatit-entsalzungsverfahren (Production of tanning substances free from ash, iron and mineral acids by using the Wofatite salt extracting process) by Rudolph, Mathauser and Sütterlin. - Technische gewinnung von vanillin aus sulfitablauge (Technical extraction of vanillin from sulfite lye) by Hilgetag and Butscheck. - Über die futter hefegewinnung aus butensulfitablauge (On obtaining fodder yeast from beech sulfite waste lye) by Gnüchtel. - Über ringspaltungsreaktionen an furanderivaten (Ring splitting reactions in derivatives of furan) by Schneidl. - Lösungs-weichmachungsmittel und reichstoffe aus furfurol (Solvents, softeners and perfumes from furfurol) by Gnüchtel and Wissenborn. - Darstellung von mono-oxalkylierten amini-phenolen (Preparation of mono-oxalkylised amino phenols) by Richter. - XVIII austausch, 1944: Durchführung der sulfochlorierung als dunkelreaktion mittels peroxyden als katalysatoren (Sulfochlorination as a blind reaction using peroxides as catalysts) by Weissenborn.- Über schmiermittel auf neue grundlage (Concerning lubricants on a new basis) by Broderson and Quaedvlieg.-Darstellung von mono-oxalkylierten phenolin (Preparation of mono-oxalkylised amino phenols) by Richter.-Trennung der vanillose (3-aethoxy-4-oxybenzaldehyd von isomeren über die sauren natriumsalze (Separating vanillose (3-ethoxy-4-oxy-benzaldehyde) from isomers over the acid sodium salts) by Stier.-Über-gerbstoffe aus buchenholz sulfitablauge und brenzöl (Tanning materials from beechwood sulfite lye and empyreumatic oil) by Rudolph and Mathauser.-Herstellung von sulfonen aus chinonen und chinonenblidenden stoffen und sulfinsäuren (Preparation of sulfones from quinones or quinone forming substances and sulfinic acids) by Mathauser.-Über eine notlichtpatrone (On an emergency illuminating cartridge) by Broderson and Rudolph.

ZETKO AUSTAUSCH, 1944 (REPORTS OF THE INTERMEDIATE PRODUCTS COMMISSION). I. G. Farbenindustrie A. G., Schkopau, Ger. Apr 1944. 14f diagr (Text in German) Mi $1.75, Enl Pr $3.75.

PB 103758

1. Patents - Germany O.Z. 14165 2. Alcohols - Condensation - Germany 3. Ethane, Dichloro - Fractionation - Germany 4. Propene, Chloro - Fractionation - Germany 5. Diproxid (Polymerization regulator) 6. ZETKO (Zwischenprodukt-Kommission) 7. Micro BIOS DOCS 2351/2247/5 8. Micro BIOS FD 4084/47, Frames 1-13.

English abstract included. Abstract available as PB 103758s. 1p. Mi $1.25, Ph $1.25. Contents: Über die kondensation von alkoholen mit alkalihydroxyden (Condensation of alcohols with alkali hydroxides) by Nelles and Fritschi.-Die thermische spaltung von aethylene chlorid und propylenchlorid

(Thermic splitting of ethylene chloride and propylene chloride) by Dörfelt.-Herstellung von diproxyd (Production of diproxide) by Zaucker.

DETERIORATION STUDIES

BACTERIA INVOLVED IN CELLULOSE DEGRADATION, by H. S. Levinson. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. May 1948. 26p graphs, tables Mi $2.00, Ph $3.75. PB 103743

The purpose of this report is to review the published work that has been done on the identity and relative activity of the bacteria decomposing cellulose. QMC MSR 9.

EFFECT OF ENVIRONMENT AND MINERAL NUTRITION ON CELLULOLYTIC ACTIVITY ON FUNGI, by J. W. Sinden, A. J. Mix and R.G.H. Siu. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Feb 1948. 56p graphs Mi $2.75, Ph $7.50. PB 103742

Determination of optimal environmental and nutritional requirements of 4 representative species of cellulose-destroying fungi. This knowledge is necessary for the development of test methods and further studies on the physiology and biochemical mechanism of the mycological breakdown of cotton fabrics. QMC MSR 8. Contract no. W44-109-qm-706.

EFFECT OF G-4 TREATMENT ON THE FUNGUS RESISTANCE OF TALON SLIDE FASTENERS, by E. F. Little. U. S. Air Materiel Command. Engineering Division, Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1951. 7p photos, table Mi $1.25, Ph $1.25. PB 103769

1. Fasteners, Interlocking slide - Fungus proofing 2. Coatings, Corrosion resistent - Tests 3. G-4 (Fungicide) 4. AAF TSEAM M5497.

INVERTASE OF MYROTHECIUM VERRUCARIA SPORES - ITS LOCATION, SYNTHESIS AND SECRETION, by G. R. Mandels and Anna B. Norton. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Feb 1949. 38p graphs, tables Mi $2.25, Ph $5.00 PB 103746

To determine the location of the enzyme invertase in the spores of the cellulolytic fungus Myrothecium verrucaria and to determine the conditions, if any, under which synthesis and discharge of enzyme occur. QMC MSR 12.

RESISTANCE OF SOME CELLULOSE DERIVATIVES TO THE FUNGUS MYROTHECIUM VERRUCARIA, by Richard T. Darby. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Jun 1948. 25p tables Mi $2.00, Ph $3.75. PB 103744

To determine the resistance of several cellulose derivatives to degradation by, and their availability as carbon sources for, the fungus Myrothecium verrucaria. QMC MSR 10.

STUDIES ON DEGRADATION OF PLASTIC FILMS BY FUNGI AND BACTERIA, by James V. Harvey and Francis A. Meloro. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Aug 1949. 53p photos, graphs, tables Mi $2.75, Ph $7.50. PB 103749

To evaluate the resistance of experimental vinyl and polyvinyl butyral films to fungal and bacterial degradation, and to improve techniques for evaluating degraded films. QMC MSR 16.

STUDIES ON THE MICROBIOLOGICAL DEGRADATION OF WOOL I: SULFUR METABOLISM, by William H. Stahl, Bernard McQue, Gabriel R. Mandels and R.G.H. Siu. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Oct 1948. 23p drawings, graphs, tables Mi $2.00, Ph $3.75. PB 103738

1. Wool - Fungus deterioration 2. Microorganisms - Sulfur metabolism 3. Microsporum gypseum 4. Sulfur - Determination 5. QMC RR BS 2.

See PB 103739 for parts II-IV.

STUDIES ON THE MICROBIOLOGICAL DEGRADATION OF WOOL. II: DIGESTION OF NORMAL AND MODIFIED FIBRILLAR PROTEINS. III: FURTHER SULFUR METABOLISM STUDIES. IV: NITROGEN METABOLISM, by William H. Stahl, Bernard McQue, Gabriel R. Mandels and R.G.H. Siu. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Aug 1949. 64p graphs, tables Mi $3.00, Ph $8.75. PB 103739

1. Wool - Fungus deterioration 2. Microorganisms - Sulphur metabolism 3. Microorganisms - Nitrogen metabolism 4. Microsporum gypseum 5. Sulfur - Determination 6. Microorganisms - Protein metabolism 7. Protein - Determination 8. Nitrogen - Determination 9. QMC RR BS 3.

See PB 103738 for Part I.

STUDIES ON THE PHYSIOLOGY OF SPORES OF THE CELLULOLYTIC FUNGUS MYROTHECIUM VERRUCARIA, by Gabriel R. Mandels and Anna B. Norton. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Jun 1948. 53p graphs, tables Mi $2.75, Ph $7.50. PB 103745

A clear understanding of the dormancy and germination of the spores of fungi concerned in biological deterioration is basic to the development of sound control measures. The primary objectives of this study have been to determine the requirements for germination, to study the factors affecting germination, to evaluate the condition of dormancy and to study the metabolism of spores during germination. The work reported here has been carried out with spores of Myrothecium verrucaria -- a strongly cellulolytic fungus. QMC MSR 11.

TESTING THE FUNGAL RESISTANCE OF PLASTIC COATED FABRICS AND PLASTIC FILMS, by James V. Harvey. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Apr 1949. 12p tables Mi $1.75, Ph $2.50. PB 103747

To establish an adequate test method for evaluating the fungal resistance qualities of plastic films. QMC MSR 13.

ELECTRICAL MACHINERY, EQUIPMENT AND SUPPLIES

Communication Equipment

FLUGSICHERUNGSWESEN, ABT. I: GRUNDLAGEN DER FUNKPEILUNG (RADIO DIRECTION FINDING (DVF). Jun 1943. 44f drawings, diagrs (Text in German) Mi $2.50, Enl Pr $7.50. PB 103829

1. Radio direction finders - Germany 2. Micro NAVSHIPS E910-46.

Electronics

AUDIO POWER SYNTHESIZER TS-679(XA)/U, by Robert W. Stolzenbach. U. S. Air Materiel Command. Engineering Division. Components and Systems Laboratory. Electronic Subdivision. Dec 1950. 20p photos, diagrs (1 fold), graphs, tables Mi $1.75, Ph $2.50. PB 104002

This report deals with the development, theory, and test of a variable frequency, variable wave-form, audio power generator. Although the main function of the Audio Power Synthesizer is for use as a power source of complex wave forms, other applications have been investigated which make it a valuable measuring instrument. Wave-form analysis of high-frequency energy at audio frequency, audio-frequency filter characteristics, intermodulation characteristics of electronic equipment, calibration source for distortion indicators, and a source of energy free of harmonics (less than 0.25% by phasing out residual harmonics in the excitation voltage) are some of the applications in which the equipment has proved itself extremely valuable. AAF TR 6269.

DER 3 KW MITTELWELLENSENDER SPEZ. 914 BS FÜR DEN WELLENBEREICH 500-3000M (THE 3-KILOWATT TRANSMITTER $914B_S$ FOR 500-3000 METER WAVE-RANGE). Telefunken-Gesellschaft für Drantlose Telegraphie m.b.H., Berlin. Feb 1941. 12f photos, diagrs (Text in German) Mi $1.75, Enl Pr $3.75. PB 103832

1. Transmitters - Germany 2. 914 B_S (Transmitter) 3. Micro NAVSHIPS E925-46.

DER 600-WATT KURZWELLENSENDER TYPE S524A (THE 600-WATT SHORT WAVE TRANSMITTER TYPE S524A). Telefunken-Gesellschaft für Drahtlose Telegraphie m.b.H., Berlin. n.d. 45f photos, drawings, graphs (Text in German) Mi $2.50, Enl Pr $7.50. PB 103833

1. S524A (Transmitter) 2. Transmitters - Germany 3. Micro NAVSHIPS E926-46.

GENAUIGKEIT DER IMPEDANZMESSUNG BEI MIKROWELLEN (ACCURACY OF IMPEDANCE MEASUREMENT OF MICROWAVES) by F. Tischer. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1950. 30p photos, diagrs, graphs (Text in German) Mi $2.00, Ph $3.75. PB 103797

The measurement of the impedance or standing wave ratio is one of the most important in microwaves. In this article there are discussed the basic theory regarding these measurements and the different types of instruments and their accuracy. The error of the measuring line has been dealt with particularly, because this instrument is at the same time a measuring standard and seems to have the best accuracy. Methods of measuring the error of this instrument and means to eliminate it are proposed. The results have been used for the design of a precision measuring line and an automatically registrating line for the S-band. Summary in English. Acta polytechnica 68, Electrical engineering series vol. 3, nr. 1. Also issued as Kungl. Tekniska Högskolans Handlingar nr. 36.

MICROWAVE FIELD-MEASUREMENTS. II. CAVITY RESONATOR FOR CONTINUOUS AXIAL AND ROTARY MOVEMENT OF MODES, BY BEVERLY C. DUNN, JR. CONTRACT N5ORI-76, TASK ORDER NO. 1, NR-078-011. Harvard University. Craft Laboratory, Cambridge, Mass. Oct 1949. 68p photos, diagrs, graphs, tables Mi $3.00, Ph $8.75. PB 104046

A cavity resonator used for studying the response of conducting loops to electromagnetic fields is described. The mechanical and electrical features of the resonator are discussed and illustrated together with associated equipment and experimental methods. The method of investigation involves a comparison between measured and calculated field characteristics, the resultant data being useful in determining the reliability of surface-current measurements and in investigating the response of loops to complex electromagnetic fields. At 3000 megacycles, the resonator can sustain six model series so that a wide range of complexity is available. A comparison between measured and theoretically calculated field characteristics at the cylindrical surface of the cavity is illustrated for the TE_{118} mode. For pt. I see PB 102179, for pt. III see PB 104047. HU CL TR 72.

MICROWAVE FIELD-MEASUREMENTS, III: ON THE RESPONSE OF LOOPS TO THE ELECTROMAGNETIC FIELD, BY BEVERLY C. DUNN, JR. CONTRACT N5-ORI-76, TASK ORDER NO. 1, NR-078-011. Harvard University. Cruft Laboratory, Cambridge, Mass. Oct 1949. 78p diagrs, graphs, tables Mi $3.50, Ph $10.00. PB 104047

A method based upon the comparison of measured and theoretically calculated field properties was used in a preliminary study of the measurement of magnetic-field characteristics at microwave frequencies by means of loops. The TE_{118} mode excited at a frequency of 3000 megacycles is utilized in the investigation, and use is made of the known field distributions near the surface of a cylindrical cavity resonator, which is designed to permit continuously variable loop location over the entire extent of the cylindrical cavity surface. A simple theory of loop systems is postulated to correlate the results of these investigations. The method is suggested as a means for studying the response of loop systems to electromagnetic-field configurations having a wide range of complexity and as a means for investigating the accuracy of surface current measurements. For pt. I see PB 102179, for pt. II see PB 104046. HU CL TR 73.

Generators, Motors, Transmission Distribution, and Allied Equipment

DOUBLE-PULSE GENERATOR FOR TRANSPONDER SIMULATION, by C. C. Watterson. U. S. Naval Research Laboratory. Mar 1951. 13p photos, diagrs

Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 103913

A video pulse generator is described which is capable of simulating a transponder whose replies are coded pulse pairs. For each effective input video keying pulse two video pulses of identical amplitude and length are delivered at the output. The coding of each pair of output pulses is determined by their spacing. The spacing can be switch-adjusted to twelve integral multiples of a basic pulse spacing. The basic pulse spacing is continuously adjustable from 2 to 18 μ sec. After an effective keying pulse produces an output pair the generator is insensitive to further keying pulses for the duration of the recovery time interval. The recovery time is adjustable between 60 and 1500 μ sec. NRL R3822.

Signal generator SG-16 (XN)/UR. INTERIM ENGINEERING REPORT, JULY 1949, ON CONTRACT NO. NOA(S)9762. REPORT SG-16-10. Radio Corporation of America. Victor Division, Camden, N. J. Aug 1949. 6p diagrs Mi $1.25, Ph $1.25. PB 104043

Progress on a reactance-controlled oscillator X'tal oscillator, variable frequency divider, r-f multiplier and output stage, and the output attenuator is covered in this interim report on signal generator SG-16 (XN-)/UR. The reactance-controlled oscillator performance is good, and the control range is in excess of 199 kc. However, the effect of line surges has yet to be eliminated. The X'tal oscillator performance meets the specifications over the operating temperature range. A more compact layout of the oscillator is being made after which performance checks will again be taken. Also, a few details need to be worked out in the variable frequency divider before it will be tried in the over-all system control.

Miscellaneous

HOCHSPANNUNGSNETZANSCHLUSSGERÄT MIT SPANNUNGSSTABILISIERUNG (HIGH TENSION NETWORK CONNECTORS WITH STEADY TENSION). Telefunken-Gesellschaft für Drahtlose Telegraphie m.b.H., Berlin. n.d. 9f diagrs (Text in German) Mi $1.25, Enl Pr $2.50. PB 103831

1. Connectors, Electric - Germany 2. Micro NAVSHIPS E916-46.

7 PIN MINIATURE HERMETICALLY SEALED ELECTRON TUBE SOCKET, EXP. 8360-6. FINAL ENGINEERING REPORT ON CONTRACT W33-038-AC-15260 AS AMENDED MARCH 8, 1949, PREPARED by S. M. Del Camp. Cinch Manufacturing Corporation, Chicago, Ill. Apr 1949. 33p diagrs Mi $2.25, Ph $5.00. PB 103639

Final test data, manufacturing procedure, and drawings of a seven-pin miniature hermetically sealed electron tube socket are submitted. Dimensions and weight of the socket are given, and mechanical shock, vibration, temperature, and electrical test results are discussed. Detailed information on the manufacture and materials of the contact assembly, body shell, silastic washer, socket body, and center shield is included.

FOOD AND KINDRED PRODUCTS

DRAWINGS RELATING TO COMPONENT PARTS OF A HOMOGENIZER FOR FOODSTUFFS. Schröder & Co., Lübeck, Ger. 1946. 66f drawings only (Legends in German) Mi $3.00, Enl Pr $10.00. PB 103817

1. Homogenizers - Design - Germany 2. Micro BIOS FD 1059/50, Frames 1-51.

English abstract included. Abstract available as PB 103817s. 1p. Mi $1.25, Ph $1.25.

INVESTIGATION OF THE APPLICATIONS OF STATISTICAL QUALITY CONTROL TO DAIRY MANUFACTURING, by A. V. Moore and J. P. CoVan. Texas. Engineering Experiment Station, College Station, Tex. Mar 1951. 24p graphs, tables Available from Texas Engineering Experiment Station, College Station, Tex. PB 103681

1. Dairy products - Quality - Statistics 2. Sampling 3. Shewhart control chart for variables 4. Statistical theory 5. Texas. Agricultural Experiment Station 6. TU EES RR 23.

Cooperative investigation by the Texas Agricultural Experiment Station and the Texas Engineering Experiment Station.

FUELS AND LUBRICANTS

AIRCRAFT MATERIAL SPECIFICATION: LOW TEMPERATURE GREASE. Gt. Brit. Ministry of Supply. Nov 1950. 14p drawings Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 103691

1. Greases, Low temperature - Specifications - Gt. Brit. 2. MS DTD MS 825.

Supersedes D.T.D. 577. This specification covers material corresponding to the United States Specification MIL-G-3278, and Canadian Government Specification Board Specification 3-GP-863.

BEHAVIOR OF IRON CONTACTS DURING THE OPERATION WITH HYDROGEN-RICH SYNTHESIS GAS (FE-CONTRACT+1/4% OF K_2CO_3). n.d. 9f Mi $1.25, Enl Pr $2.50. PB 104015

1. Gasoline - Catalysts 2. Gasoline - Synthesis 3. Catalysts, Iron 4. Micro NAVSHIPS M743-46.

Title page illegible.

D.V.L. LUBRICATION CONFERENCE, 11TH-12TH DEC 1941, PT. I. Deutsche Versuchsanstalt für Luftfahrt, E. V., Berlin. Dec 1941. 20f tables Mi $1.75, Enl Pr $3.75. PB 103859

1. Lubrication - Germany 2. Molecules - Orientation - Germany 3. Micro BIOS FD 2874/46, Item 35, Frames 1-20.

Contents: p. 15-21. Fundamental principles of the process of lubrication, by Dr. Vogelpohl.-p.23-41. On the orientation of molecules in liquids and their mechanical properties, by Dr. Harms.-p.43-57. On the orientation of molecules at boundary surfaces, especially on metallic boundary surfaces. by Dr. Dunken.

EFFECT OF INITIAL MIXTURE TEMPERATURE ON FLAME SPEED OF METHANE-AIR, PROPANE-AIR, AND ETHYLENE-AIR MIXTURES, by Gordon L. Dugger. U. S. National Advisory Committee for Aeronautics. May 1951. 29p photo, diagr, graphs, tables Mi $2.00, Ph $3.75. PB 103980

Flame speeds of methane-air mixtures and ethylene-air mixtures were determined as functions of mixture composition at initial mixture temperatures ranging from 34° to 344° C by a Bunsen-burner method. The data were compared with reported data for propane and air; the maximum flame speeds increased with temperature at increasing rates and were affected on the percentage basis in the decreasing order, methane, propane, and ethylene. Both a thermal and diffusion theory predicted the effect of temperature of maximum flame speed within 20 percent. Straight-line correlations were found between maximum flame speed and calculated equilibrium hydrogen-atom concentration (at adiabatic flame temperature) for each fuel. NACA TN 2374.

EFFECT OF ROLLING COTTONSEED MEATS ON OIL EXTRACTION, by Homer E. Rea., Jr. and A. Cecil Wamble. Texas. Engineering Experiment Station, College Station, Tex. Sep 1950. 23p diagrs, graphs, tables Available from Texas Engineering Experiment Station, College Station, Tex. PB 103678

Research covered in this publication has provided data on the rolling process. Two types of machinery were compared in this study to provide data of importance to oil mill operating economy. The data indicated which type of rolling process required lowest power consumption and also gave information on the proper thickness to which cottonseed meats must be rolled for greatest extraction efficiency by the hydraulic process. TU EES RR 16.

EXTRACTION OF OIL FROM OIL-BEARING MATERIALS BY PREPRESSING FOLLOWED BY SOLVENT EXTRACTION, by Homer E. Rea., Jr. and A. Cecil Wamble. Texas. Engineering Experiment Station, College Station, Tex. Feb 1950. 13p drawing, tables, graph Available from Texas Engineering Experiment Station, College Station, Tex. PB 103675

The data obtained show that removing a large portion of the oil by mechanical pressure prior to solvent extraction has the advantages of increased plant capacity, lower solvent requirements, lower percentage of fines, and residual oils in cake of one per cent or less. Cooperative investigation by the Cotton Research Committee of Texas and the Texas Engineering Experiment Station. TU EES RR 11.

ISOMERIZATION OF N-BUTANE, by Dr. Vogel and Dr. Jannek. I. G. Farbenindustrie A. G., Oppau, Ger. May 1942. 4p table Mi $1.25, Ph $1.25. PB 103783

1. n-Butane - Isomerisation - Germany 2. Sinclair Refining Co. Research and Development Dept. 3. Micro TOM 300 frames 7325-7329, translation.

Translated by M. Beth, Sinclair Refining Co., Research and Development Dept. Translation book 1950-163.

ON A GRAPHICAL METHOD OF GAS ANALYSIS, by P. de Haller. 1945. 26f diagrs, graphs Mi $2.00, Enl Pr $5.00. PB 104021

1. Gas analysis - Methods 2. Graphic methods 3. Micro NAVSHIPS M456-46 4. Micro TEP T/2555.

PHYSICAL DATA ON HYDROGEN PEROXIDE. I. G. Farbenindustrie A. G., Oppau, Ger. 1944. 18f diagrs, graphs (Text in German) Mi $1.75, Enl Pr $3.75. PB 103992

1. Hydrogen peroxide - Physical properties - Germany 2. Hydrogen peroxide - Decomposition - Germany 3. Hydrogen peroxide - Specific gravity - Germany 4. Micro BIOS FD 3115/46, Frames 1-17.

Abstract available as PB 103992s. 1p. Mi $1.25, Ph $1.25.

REINIGUNG VON BRAUNKOHLENSCHWELTEER ZUR HERSTELLUNG VON SCHMIERÖLEN (PURIFICATION OF BROWN COAL BY LOW TEMPERATURE DISTILLATION FOR THE PRODUCTION OF LUBRICATING OIL) BY DR. FLESCH. ÜBER HOCHWERTIGE SCHMIERÖLE AUS ERDÖL UND KOHLEPRODUKTEN (HIGH GRADE LUBRICATING OIL FROM MINERAL OIL AND COAL BY-PRODUCTS) by Dr. Zorn. I. G. Farbenindustrie A. G., Oppau, Ger. Mar 1937-May 1938. 33f photos, drawings, graph, tables (Text in German) Mi $2.25, Enl Pr $6.25. PB 103861

1. Lubricating oils - Production - Germany 2. Coal - By-products - Uses - Germany 3. Mineral oils - Uses - Germany 4. Lignite - Distillation - Germany 5. Micro BIOS FD 3539/47, Frames 1-33.

Abstract available as PB 103861s. 1p. Mi $1.25, Ph $1.25.

SURFACE CHEMICAL PHENOMENA IN LUBRICATION, by J. E. Brophy and W. A. Zisman. U. S. Naval Research Laboratory. Jun 1950. 29p diagrs, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Mimeo: $.75. PB 103774

1. Surfaces - Adsorptive properties 2. Surface active agents - Research 3. Metal surfaces - Lubrication 4. Lubricants - Viscosity 5. NRL R 3680.

SYNTHETISCHE SCHMIERÖLE AUS REINEN KOHLENWASSERSTOFFEN (SYNTHETIC LUBRICATING OILS FROM PURE HYDROCARBONS), by Dr. Haag and Dr. Zorn. I. G. Farbenindustrie A. G., Oppau, Ger. 1938. 28f graphs, tables (Text in German) Mi $2.00, Enl Pr $5.00. PB 103860

1. Hydrocarbons, Aliphatic - Polymerization - Germany 2. Olefins - Polymerization - Germany 3. Lubricating oils, Synthetic - Manufacture - Germany 4. Micro BIOS FD 3400/46, Frames 430001279-430001306.

Abstract available as PB 103860s. 1p. Mi $1.25, Ph $1.25.

VERZEICHNIS DER ENTWICKLUNGSARBEITEN DES TECHNISCHEN PRÜFSTANDES AUF DEM GEBIETE DER LUFTFAHRT (REVIEW OF RESEARCH WORK ON TEST METHODS AND TEST INSTRUMENTS FOR AVIATION FUELS AND LUBRICANTS). I. G. Farbenindustrie A. G., Ludwigshafen, Ger. 1943. 15f (Text in German and English) Mi $1.75, Enl Pr $3.75. PB 103885

1. Fuels, Aviation - Research - Germany 2. Fuels, Aviation - Tests - Germany 3. Lubricants - Research - Germany 4. Lubricants - Tests - Germany 5. Testing equipment - Germany 6. Micro BIOS FD 2872/46, Item 40, Frames 1322-1331+5.

Abstract available as PB 103885s. 2p. Mi $1.25, Ph $1.25.

HIGHWAYS AND BRIDGES

SIGNIFICANCE OF TESTS FOR ASPHALTIC MATERIALS, by Marshall Brown and Fred J. Benson. Texas. Engineering Experiment Station, College Station, Tex. Jul 1950. 83p photos, diagrs, graphs, tables Available from Texas. Engineering Experiment Station, College Station, Tex. PB 103685

This bulletin treats the testing of asphaltic materials principally from the standpoint of the interpretation of the test results, and is the result of experience derived from any years of materials testing. Agricultural and Mechanical College of Texas. Bulletin, ser. 5, v. 6, no. 7, Jul 1950. TU EES B 119.

INSTRUMENTS

AUTOMATIC CONTINUOUS FLOW OXYGEN REGULATOR, by John W. Natwick. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1951. 19p photos, drawings, diagrs, graph, tables Mi $1.75, Ph $2.50. PB 103770

1. Oxygen regulators - Tests 2. AN6010 (Oxygen regulator) 3. AAF TSEAA MR 660-126-B.

DER NEUE "ANSCHUTZ" TYP HMK. BETRIEBSVORSCHRIFT (THE NEW GYRO-COMPASS TYPE HMK. OPERATING INSTRUCTIONS). N.V. Nederlandsche Technische Handel Maatschappij "Giro", Den Haag. n.d. 52f drawings, diagrs (Text in German) Mi $2.75, Enl Pr $8.75. PB 103838

1. HMK (Gyro-compass) 2. Compasses, Gyro - Germany 3. Micro NAVSHIPS S58-46.

DER NEUE "ANSCHÜTZ" TYP HMK, EIN KREISELKOMPASS HÖCHSTER ZUVERLÄSSIGKEIT (THE NEW "ANSCHÜTZ" TYPE HMK, A GYRO-COMPASS OF HIGHEST RELIABILITY). N. V. Nederlandsche Technische Handel Maatschappij "Giro", Den Haag. n.d. 45f drawings, diagrs (Text in German) Mi $2.50, Enl Pr $7.50. PB 103837

1. HMK (Gyro-compass) 2. Compasses, Gyro - Germany 3. Micro NAVSHIPS S57-46.

DESCRIPTION OF A STEP ACCELEROMETER WITH REMOTE READING. Askania-Werke A. G. 1943. 7f photos, diagrs (Text in German) Mi $1.25, Enl Pr $2.50. PB 103329

1. Accelerometers - Design - Germany 2. Micro BIOS FD 1014/50, Frames 1-6.

English abstract included. Abstract available as PB 103329s. 1p. Mi $1.25, Ph $1.25.

E KOMPASS, GRUNDLAGEN UND BESCHREIBUNG FÜR OFFIZIERE UND OBERFELDWEBEL LFB. II, ANHANG. ZUSAMMENSTELLUNG MÖGLICHER STÖRUNGEN (THE COMPASS, PRINCIPLES AND DESCRIPTION FOR OFFICERS AND FIELD COMMANDERS, PT. 2, SUPPLEMENT: COLLECTION OF POSSIBLE DISORDERS), by Herr Sudau. 1943. 28f diagrs (Text in German) Mi $2.00, Enl Pr $5.00. PB 103839

1. Compass - Maintenance and repair - Germany 2. Micro NAVSHIPS S77-46

GEBRAUCHSANWEISUNG PHILIPS ELEKTRONENSTRAHLOSZILLOGRAPH GM3155B (INSTRUCTIONS FOR USE OF PHILIPS CATHODE-RAY OSCILLOGRAPH GM3155B). Philips Electro-Special G.m.b. H., Berlin. May 1946. 19f photos, diagrs (Text in German) Mi $1.75, Enl Pr $3.75. PB 103827

1. GM3155B (Oscillograph) 2. Oscillographs, Cathode ray - Germany 3. Micro NAVSHIPS E585-46.

THREE-CHANNEL PIEZO-ELECTRIC PRESSURE RECORDER, by P. J. Fletcher. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Nov 1949. 12p diagrs, drawings Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 103692

To speed up operation of a low speed cascade tunnel, an apparatus has been constructed to record the pressures needed for "loss coefficients". The pressures are, upstream total head, downstream total head, and downstream static pressure. An electrical method of recording has been chosen on account of the ease with which the sensitivity can be varied to accommodate a large tunnel speed range. A diaphragm-loaded quartz crystal is used as the pressure sensitive element. The signal from the crystal is indicated on a cathode ray oscilloscope and recorded by a 35 mm. moving film camera. To record the three pressures concurrently, they are connected in sequence by a rotary valve to the quartz crystal pick-up, and the potential produced amplified by long time-constant circuits. Cover date is 1951. Memorandum no. M. 64. S.O. Code no. 23-9006-35. ARC CP 35.

VALVE, ANTI-G, NO-LEAK, USAF EXPERIMENTAL TYPE M-8, ARO EQUIPMENT CORPORATION, TYPE NO. 10050. REPORT OF TESTS by E. E. Martin and Raymond U. Whitney. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Mar 1951. 3p Mi $1.25, Ph $1.25. PB 103768

1. M-8 (Valve) 2. Valves - Tests 3. AAF TSEAA 689-4L.

LUMBER AND WOOD PRODUCTS

ESSENCES FORESTIERS ET BOIS DU CONGO: AFRORMOSIA ELATA, DISTRIBUTION GEOGRAPHIQUE, CHARACTERISTIQUES TECHNOLOGIQUES, STRUCTURE ET COMPORTEMENT A L'USAGE (FOREST PRODUCTS AND LUMBER OF THE CONGO: AFRORMOSIA ELATA (SATIN WOOD), GEOGRAPHICAL DISTRIBUTION, PHYSICAL PROPERTIES AND USES), by J. Fourage. Institut National pour l'Etude Agronomique du Congo Belgique. 1943. Translated by F. Rizzo. Feb 1951. 4p Mi $1.25, Ph $1.25. PB 103668

1. Afrormosia Elata - Belgian Congo 2. Forest products - Belgian Congo 3. NAVSHIPS T404.

WOOD-STOVE PIPES, by Stig Regnell. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1950. 155p photos, drawings, diagrs, graphs, tables Mi $6.00, Ph $20.00. PB 103794

The paper throws light on the design and functioning of wooden pipes, as also the economic considera-

tions affecting their design. The structural shape is discussed on the basis of a newly developed theory and with the support of stresses, both measured on pipes in use and obtained in swelling tests which have been going on without interruption for more than three years. A theory advanced earlier concerning the course of freezing has been confirmed by a number of observations. The author recommends Manning's formula for computation of loss of head in wooden pipes and suggests values for the coefficient M therein comprised. Finally, a number of wooden pipes executed are described. Acta polytechnica 65, Civil engineering and building construction series, vol. 2, no. 1. Bulletin no. 23 of the Institution of Hydraulics. Also issued as Kungl. Tekniska Högskolan Handlingar nr. 33.

WOODOMAT FURNACE. Northeastern Wood Utilization Council, New Haven, Conn. May 1949. 13p photos, drawing Available from Northeastern Wood Utilization Council, P. O. Box 1577, New Haven 6, Conn. $.25. PB 103345

The present bulletin describes a warm air furnace that is a direct result of the Council's effort to match supply with demand. The Woodomat furnace, operating on the "down draft" principle, grew out of research and experimentation. NWUC B 27.

MACHINERY

ANALYTICAL EVALUATION OF AERODYNAMIC CHARACTERISTICS OF TURBINES WITH NONTWISTED ROTOR BLADES, by William R. Slivka and David H. Silvern. U. S. National Advisory Committee for Aeronautics. May 1951. 56p diagr, graphs (2 fold. in pocket) Mi $2.75 Ph $7.50. PB 103902

An analytical evaluation is made of the aerodynamic characteristics of turbines with nontwisted rotor blades by comparison with the corresponding characteristics of free-vortex turbines. Working charts for aid in design of nontwisted-rotor-blade turbines are presented. NACA TN 2365.

ANFAHRVERSUCH MIT TROMMEL UND E-HILFSMASCHINEN MIT NATÜRLICHEN ZUG AM 12.2.36. E-UMWÄLZPUMPE (STARTING TEST WITH CYLINDER AND AUXILIARY ENGINE AT NORMAL STROKE. E-ROTARY PUMP. Blohm & Voss K. G., Hamburg, Ger. Feb 1936. 6f graphs only (Text in German) Mi $1.25, Enl Pr $2.50. PB 104016

1. Pumps, Rotary - Tests - Germany 2. Micro NAVSHIPS S308-46.

APPLICATION OF THE RELAXATION METHOD TO THE HEAT PUMP GROUND COIL PROBLEM, by Ronald S. Brand and Charles H. Coogan, Jr. Connecticut. University. Engineering Experiment Station, Storrs, Conn. Mar 1951. 9p diagrs, graphs Available from University of Connecticut, Engineering Experiment Station, Storrs, Conn. PB 103893

This bulletin reports the results of a numerical integration of the differential equations describing the temperature distribution around a single straight horizontal heat pump ground coil tube maintained at a constant temperature. The yearly mean soil temperatures and their fluctuation due to the temperature variation at the surface are determined. Bulletin no. 7.

CONTINUOUS MACHINE CASTING PROCESS. Vereinigte Deutsche Metallwerke, Frankfurt am Main, Ger. Aug 1945. 16f drawings, graphs (Text in German) Mi $1.75, Enl Pr $3.75. PB 103819

1. Machines, Casting - Drawings - Germany 2. Furnaces, Casting - Design - Germany 3. Aluminum - Casting - Germany 4. Micro BIOS FD 1120/46, Frames 1-13.

English abstract included. Abstract available as PB 103819s. 2p. Mi $1.25, Ph $1.25. Report is incomplete.

GAS TURBINE BLADE COOLING, by Bertram John Milliville. May 1947. 78f drawings, diagrs, graphs Mi $3.50 Enl Pr $11.25. PB 104220

Thesis-Massachusetts Institute of Technology. A thesis on turbine blade cooling is presented. Blade cooling is to be considered in this thesis as a means of improving the thermal efficiency of the gas turbine by permitting the use of increased turbine inlet temperature. A simple blade cooling system is suggested and analysed. This system consists of air cooling, with air passing through a passage or passages in the blade and discharging into the hot gas stream. The system was selected for analytical purposes, because it is reasonably simple, involving only minor modifications in design, and because it is susceptible to theoretical analysis.

INVESTIGATION OF ROCK DRILLING EQUIPMENT FOR FENCE POSTHOLES AND OTHER FARM USES, by Edsel J. Burkhart. Texas. Engineering Experiment Station, College Station, Tex. Oct 1950. 30p diagrs, map Available from Texas Engineering Experiment Station, College Station, Tex. PB 103679

1. Drilling, Rock - Equipment 2. Post-hole diggers 3. TU EES RR 17.

LAUFEIGENSCHAFTEN VON SINTERMETALLEN (BEARING PROPERTIES OF SINTERED METALS), by R. Weber. Metallgesellschaft A. G., Frankfurt am Main, Ger. 1940. 53f photos, graphs, tables (Text in German) Mi $2.75, Enl Pr $8.75. PB 103818

1. Metals, Bearing - Germany 2. Metals, Sintered - Uses - Germany 3. Micro BIOS HEC 3708 4. Micro BIOS FD 1310/46, Frames 284,286-337.

Abstract available as PB 103818s. 1p. Mi $1.25, Ph $1.25.

NORMUNG UND FERTIGUNG FEINMECHANISCHER ZAHNRÄDER (STANDARDIZATION AND PRODUCTION OF PRECISION GEAR WHEELS). Deutscher Normenausschuss E. V. 1948. 188f drawings, tables (Text in German) Mi $6.75, Enl Pr $25.00. PB 103987

1. Gears - Production - Germany 2. Gears - Standards - Germany 3. Micro BIOS FD 1062/50, Frames 1-187.

English abstract included. Abstract available as PB 103987s. 1p. Mi $1.25, Ph $1.25. Unterlüss report 425.

POSSIBLE APPLICATION OF BLADE BOUNDARY-LAYER CONTROL TO IMPROVEMENT OF DESIGN AND OFF-DESIGN PERFORMANCE OF AXIAL-FLOW TURBOMACHINES, by John T. Sinnette, Jr. and George R. Costello. U. S. National Advisory Council for Aeronautics. May 1951. 32p diagrs Mi $2.25, Ph $5.00. PB 103948

A theoretical discussion of the application of blade boundary-layer control to increase the efficiency and the stage pressure ratio and to improve off-design performance of compressors and turbines is presented. A method based on the potential flow of a compressible fluid is developed for designing suction, or ejection, slotted blades with a prescribed velocity distribution along the blade and in the slot. The effect of the boundary layer on the design of the slot and the effect of ejecting gas at stagnation pressures and temperatures different from free-stream values are discussed. NACA TN 2371.

SECTIONAL DRAWING OF A PUMP FOR LIQUEFIED GASES HAVING A CAPACITY OF 1000M^3/H. I. G. Farbenindustrie A. G., Griesheim, Ger. Aug 1944. 5f drawings only (Legends in German) Mi $1.25, Enl Pr $1.50. PB 103989

1. Pumps, Liquefied gases - Design - Germany 2. Compressors - Pumps - Design - Germany 3. Micro BIOS FD 1124/50, Frame 1.

English abstract included. Abstract available as PB 103989s. 1p. Mi $1.25, Ph $1.25.

SINGLE AND MULTI-SPINDLE HIGH SPEED PRECISION DRILLING MACHINES. Krause, Ernst & Co., A. G., Berlin. n.d. 50f photos, diagrs (Text in German) Mi $2.50, Enl Pr $7.50. PB 90760

1. Machines, Drilling and boring - Germany 2. Micro BIOS FD 1664/47, Frames 1-49.

English abstract included. Abstract available as PB 90760s. 1p. Mi $1.00, Ph $1.00.

TEILBERICHT ÜBER DIE UNTERSUCHUNG DES EINFLUSSES EINER SCHRÄNKUNG UM 120° AN ABSCHNITTEN DER KURBELWELLE HBN 23271 VON WERK HUTA BANKOWA IN DOMBROWA. UND ABSCHLIESSENDER BERICHT (REPORTS ON THE INVESTIGATION OF THE INFLUENCE OF AN OFFSET OF 120° ON THE TORSIONAL FATIGUE LIMIT OF THE CRANKSHAFT OF A DIESEL ENGINE), by Ruef. Maschinenfabrik Augsburg-Nürnberg A. G., Ausburg, Ger. Jan-Jul 1941. 26f photos, drawings, graphs (Text in German) Mi $2.00, Enl Pr $5.00. PB 103815

1. Crankshafts - Fatigue tests - Germany 2. Micro BIOS FD 1035/50, Frames 1-25.

English abstract included. Abstract available as PB 103815s. 1p. Mi $1.25, Ph $1.25.

MEDICAL RESEARCH AND PRACTICE

EFFECT OF RAPID AND PROLONGED REWARMING ON LOCAL COLD INJURY, by Josef Pichotka, and R. B. Lewis. U. S. Air Force School of Aviation Medicine, Randolph Field, Tex. Apr 1951. 15p photos, graph, tables Mi $1.75, Ph $2.50. PB 104006

The results of experiments on the effect of rapid and prolonged rewarming performed on 314 rabbits are described. Skin and muscle necrosis was determined both qualitatively and quantitatively using several degrees of cold injury; exposure to -10°, -12°, and -15° C. for 30 minutes. In all instances skin necrosis was either prevented or markedly decreased by rapid rewarming in 42° C. water for 5 to 8 minutes immediately after freezing. The results with respect to muscle necrosis were less clear. Rapid rewarming showed a definite trend toward improvement with regard to muscle necrosis. Prolonged rewarming in 42° C. water up to 1 hour produced the same beneficial results with respect to both skin and muscle necrosis. Project number 21-23-006, Report number 7.

EFFECT OF RETINAL ILLUMINATION ON VISUAL PERCEPTION OF SPACE. I: EXPERIMENTAL STUDIES RELATED TO A SPECIAL TYPE OF ANISEIKONIA, by Paul A. Cibis. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Mar 1951. 30p photo, diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 103909

Analysis is made of a special type of aniseikonia (unequal imagery in the two eyes) due to differences in the retinal illumination, the state of refraction or in the relational threshold of brightness. The spatial distortion and angular disparity between the correlated boundaries or real and apparent patterns increase as the differences in retinal illumination, refraction, and sensitivity to light increase. The threshold amplitude of depth discrimination remains constant. It is recommended that methods be standardized to cover depth discrimination, aniseikonia due to overall magnification (type I) and aniseikonia due to differences in retinal illumination or retinal sensitivity to light (type II). AAF SAM Proj 21-31-011. Report no. 1.

MORPHOLOGICAL CHANGES OF ADRENAL CORTEX IN FROST-BITTEN RABBITS WITH AND WITHOUT HEPARIN TREATMENT, by Bernhard Hoelscher. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1951. 8p photos, tables Mi $1.25, Ph $1.25. PB 104007

A study was made to determine the morphological changes in the adrenal cortex in rabbits suffering local cold injury, with and without heparin therapy. A total of 199 adrenals from frostbitten rabbits, with and without heparinization, were investigated histologically. Only those adrenal glands fixed immediately after autopsy were evaluated. The increase found in the adrenal weight was in direct relationship to the degree of cold injury and was paralleled by a decrease in body weight. In animals that received heparin but were not exposed to cold the adrenal weight was slightly augmented. In severe cold injury degenerative changes of the adrenal cortex, which were increased in severity by heparin treatment, were observed. Project number 21-23-06, Report number 8.

METALS AND METAL PRODUCTS

BRANCH SYMPOSIUM ON HIGH TEMPERATURE STEELS AND ALLOYS FOR GAS TURBINES, by Anos J. Shaler. U. S. Office of Naval Research. London Branch. Apr 1951. 32p Mi $2.25, Ph $5.00. PB 103890

In this report the authors' synopses of the thirty-six papers are presented, together with condensations of the discussions. The papers were not read at the meeting, but were summarized in groups by rapporteurs; each group was then discussed as an entity. The subjects most extensively discussed were: 1. The relative advantages of machining, casting, forming, and powder-metallurgy processes for blade manufacture. 2. Vanadium corrosion.

3. The use and misuse of creep-testing equipment for long-time tests. 4. The conservation of strategic materials. 5. The nature of engineers' specifications and the need for greater co-operation between engineers and metallurgists. 6. The necessity for stress analyses in blades and discs. 7. Cracking in welds made on austenitic alloys. 8. The necessity for developing alloy design into a science. 9. The necessity for the development of accelerated creep-tests. 10. The brittleness of chromium. 11. The need for data on creep properties of cold work or warm work alloys. The subjects' index is included with this report to enable the reader to find the discussion on each of these and other subjects. Major currents of a less objective nature noted by participants at the meeting might be listed as follows: 1. A sense of the urgent need for solutions to the major problems of gas turbine materials. 2. A reasonable willingness on the part of British engineers and metallurgists to co-operate in the solution of these problems. 3. Doubts about finding a solution to two of the major problems: vanadium corrosion, and accelerated tests for creep. ONRL TR 32-51.

CHOKE CONTROL IN FINGER GATING, by W. H. Johnson, H. F. Bishop, and W. S. Pellini. U. S. Naval Research Laboratory. Jan 1951. 18p photos Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Mimeo: $.50. PB 103773

Various designs of finger-gating systems were studied to evolve general principles of choke control for multiple-finger-gating systems. In a free or non-choked system, the metal follows preferential paths dictated by the inertia of the metal stream and the geometry of the gating system, resulting in nonuniform flow. It was found that if a choke condition is developed at the finger inlets, the gating system becomes pressurized and forced, and that uniform flow occurs from all fingers regardless of position. The geometric shape of the fingers has been shown to be of secondary importance to choke control. Fingers which provide high frictional resistance to flow add to the choking effect, and thus require less than normal geometric choking to produce pressurization. The relationships between geometric and hydraulic-choked conditions are demonstrated. NRL R 3801.

CONTRIBUTION OF RISER AND CASTING END EFFECTS TO THE SOUNDNESS OF CAST STEEL BARS, by H. F. Bishop, E. T. Myskowski, and W. S. Pellini. U. S. Naval Research Laboratory. Mar 1951. 16p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 103915

The length of cast bars which can be made sound has been determined radiographically and related to thermal gradient conditions. It was found that for steels containing 0.25 to 0.35 percent carbon the maximum distance in inches which can be made sound follows an empirical rule given by the formula $D_{max} = 6\sqrt{T}$, where T represents section thickness. This relationship of thickness to length holds for bars in a thickness range of 2 to 6 inches, cast in either the vertical or horizontal position. Vertical 8-inch bars can be made sound for a somewhat greater distance due to convection current effects. Thermal analyses showed that a minimum gradient of 6° to 12°F per inch is required in order to feed bar sections to complete soundness. This observation is compared with the gradient conditions required for feeding of plates reported previously to be in the order of 1° to 2°F per inch. It is deduced that differences in the course of solidification of bar and plate sections attributable to the geometrics of the respective sections are the basis for the effect. It is concluded that directional solidification does not necessarily assure soundness. Depending on the geometry of the casting a minimum gradient conditions in excess of that required for directional solidification may be required for feeding to soundness. NRL R 3811.

DRAWINGS RELATING TO THE TANTALUM PRODUCTION PLANT. Siemens & Halske A.G., Berlin. 1942-1945. 126f drawings only (Legends in German) Mi $5.00, Enl Pr $17.50. PB 103986

1. Tantalum - Production equipment - Design - Germany 2. Micro BIOS FD 1060/50, Frames unnumbered.

English abstract included. Abstract available as PB 103986s. 1p. Mi $1.25, Ph $1.25. For report on production of tantalum at this plant see Micro BIOS FD 5316/47.

EVALUATION OF MECHANICAL PROPERTIES AND FOUNDRY CHARACTERISTICS OF MAGNESIUM-BASE CASTING ALLOYS RECOMMENDED FOR ELEVATED TEMPERATURE APPLICATIONS. FINAL REPORT ON CONTRACT NO. NOA (S)10576, by K. E. Nelson. Dow Chemical Co. Magnesium Laboratories, Midland, Mich. Jan 1951. 70p photos, graphs, tables Mi $3.00, Ph $8.75. PB 103793

A comparison of the serviceability of these alloys can best be made by static tensile tests at 70°F, 400°F, and 600°F, and by the determination of the creep limits of the alloys at 400°F and at 600°F on bars sectioned from castings of these compositions. In case two or more of the alloys possess equivalent serviceability properties, then the choice of alloys might rest upon the castability characteristics exhibited by them. The term castability as used in this report refers to the ability of an alloy to satisfactorily fill a sand mold and to form a casting relatively free of deleterious defects. Hardness determinations and the corrosion resistance in 3% NaCl water solution of the three compositions were also obtained. Although the tensile and creep properties of EM61 (s) alloy at 400°F and 600°F are excellent the brittle nature, relatively poor castability, and poor corrosion resistance of the alloy make it less desirable as a casting alloy for jet engine applications. XK30-HTA, while slightly inferior in properties at 600°F, appears to be a better all around composition. Report no. 15179.

FATIGUE TESTS WITH STRESS CYCLES OF VARYING AMPLITUDE, by G. Wallgren. Flygtekniska Försöksanstalten (FFA) Stockholm. 1949. 34p drawings, graphs, tables Mi $2.25, Ph $5.00. PB 104033

Fatigue tests with stress cycles of varying amplitude were conducted on unnotched sheet, notched by drilled holes, and riveted joint specimens of 24S-T and 75S-T alclad aluminum and Cr-Mo steel. The loads were varied according to two different load conditions representative of stresses due to gust and maneuvering loads on aircraft wings. The purpose of the tests was to check the validity of the so-called cumulative damage theory, which maintains

that failure will occur when the sum of all part damages equal unity. This hypothesis is a useful approximation for determining the life of structural elements when subjected to fatigue loads with stress cycles of varying amplitude. FFA no. 28.

IRON POWDER BY DISSOLVING SCRAP, by H. Kassner. Metallgesellschaft A. G., Frankfort, Ger. Dec 1942. 14f graphs, tables (Text in German) Mi $1.75, Enl Pr $3.75. PB 103882

1. Iron powders - Production - Germany 2. Scrap metal - Recovery processes - Germany 3. Micro BIOS HEC 12307 4. Micro BIOS FD 285/48, Frames 1764-1778.

Abstract available as PB 103882s. 1p. Mi $1.25, Ph $1.25.

NEW METHOD OF ZINC PRODUCTION. Duisburger Kupferhütte, Duisburg, Ger. Nov 1945. 8f drawings, diagrs, graphs (Text in German) Mi $1.25, Enl Pr $2.50. PB 103751

1. Zinc - Electrolytic production - Germany 2. Micro BIOS DOCS - /1067 3. Micro BIOS FD 1265/47, Frames 1-7.

English abstract included.

ON THE PRINCIPLES OF ELECTRODEPOSITION OF METAL POWDERS, by Gösta Wranglen. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1950. 38p photos, graph Mi $2.25, Ph $5.00. PB 103798

Two factors are responsible for the formation of powdery and spongy metal deposits on the cathode: depletion of the cathode film and hydroxide formation in the cathode film. Depeltion is favored by: low concentration, high current density, low temperature, stationary electrolyte and the presence of neutral salts. Hydroxide formation is often favored by the same conditions but sometimes the ratio of hydrogen and metal overvoltage is more important, as with zinc and cadium in neutral solutions. Powder formations on the cathode in the electrolysis of fused salts and of copper, iron, nickel, zinc and cadium solutions is discussed and analyzed. Acta polytechnica 69, Electrical engineering series vol. 3, nr. 2. Also issued as Kungl. Tekniska Högskolans Handlingar nr. 37.

REPORT ON RESEARCH WORK FOR IMPROVEMENTS IN THE MANUFACTURE OF CERAMIC LIQUID GOLD, by Yoshioka Tosaku and Nakanishi Kenji. Kyoto. Imperial University, Kyoto, Japan. n.d. 13f tables Mi $1.75, Enl Pr $3.75. PB 103988

1. Pigments, Gold - Japan 2. Ceramics - Japan 3. Rosin - Condensation products - Japan 4. Pinene - Condensation - Japan 5. Turpentine - Condensation - Japan 6. Micro BIOS FD 1102/50, Frames 1-12.

English abstract included. Abstract available as PB 103988s. 1p. Mi $1.25, Ph $1.25.

SOLIDIFICATION OF STEEL FROM SAND AND CHILL WALLS, by H. F. Bishop, F. A. Brandt and W. S. Pellini. U. S. Naval Research Laboratory. Jan 1951. 29p photos, graphs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.75. PB 103559

Thermal studies of the solidification of steel from chill and sand walls have shown that solidification proceeds in wavelike fashion by the travel of "start of freeze" and "end of freeze" waves. The thermal characteristics of the mold walls determine the rate and mode of travel of these waves. In the case of the chill walls, which remove the heat at a high rate, the two waves travel in conjunction, thus creating a band of freezing which proceeds to completion through isothermal liquid. In the case of sand walls, which remove heat at relatively low rates, the process is distinctly different in that the "start of freeze" wave completes its travel through isothermal liquid separately, creating a semisolid condition which extends through the entire casting. The effects of mold wall thickness and superheat of the metal have been shown to modify the timing and rate of progression of the freezing waves. NRL R 3785.

SURFACE PROTECTION OF STEELS AND LIGHT METALS AGAINST THE SPECIAL FUELS T-STUFF AND C-STUFF. Walter, H., K. G., Kiel, Ger. 1943-1945. 32f drawings (Text in German and English) Mi $2.25, Enl Pr $6.25. PB 103298

1. Light metals - Corrosion prevention - Germany 2. Steel - Corrosion prevention - Germany 3. Atrament process (Corrosion prevention) 4. Hydrazine hydrate - Germany 5. Hydrogen peroxide - Germany 6. Micro BIOS FD 1007/50, Frames 1-31.

English abstract included. Abstract available as PB 103298s. 1p. Mi $1.25, Ph $1.25.

UREA CHLORIDE, ALUMINUM AND MAGNESIUM CHLORIDES, "BLANCOROL". PRODUCTION PROCESSES AND PLANT PROJECTS. I. G. Farbenindustrie A. G., Schkopau, Ger. 1935-1944. 33f drawings (Text in German) Mi $2.25, Enl Pr $6.25. PB 103884

1. Aluminum chloride - Production - Germany 2. Magnesium chloride - Production - Germany 3. Urea chloride - Germany 4. Hydrochloric acid - Storage - Germany 5. Leather - Tanning materials - Germany 6. Blancorol (Trade name) 7. Cyanuric acid - Preparation - Germany 8. Micro BIOS FD 2082/47, Frames 1-24.

English abstract included. Abstract available as PB 103884s. 3p. Mi $1.25, Ph $1.25.

YIELD POINT OF MILD STEEL AT NON-HOMOGENOUS AND COMPOUND STRESS DISTRIBUTIONS, by F.K.G. Odqvist and C. Schaub. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1950. 15p diagrs, graph Mi $1.75, Ph $2.50. PB 103796

A new theory for the apparent yield point of mild steel at non-homogeneous and compound stress distributions is advanced, the flow limit being associated with the spreading of flow layers through part of the section of the test piece. The theory involves a material constant d, which may be determined either from macroscopic measurements or from X-ray measurements of the stress distribution preceding the spreading of flow layers. Paper read before the VI Congress for Applied Mechanics, Paris, Sept. 1946 and subsequently completed. Acta polytechnica 66, Mechanical engineering series vol. 1, nr. 11. Also issued as Kungl Tekniska Högskolans Handlingar nr. 34.

MINERALS AND MINERAL PRODUCTS

CERAMIC COATING SLIP FOR PROTECTION OF METAL DURING HEAT TREATING, by Dwight G. Bennett, William J. Plankenhorn and Maynard P.

Bauleke. U. S. Air Materiel Command. Engineering Division. Power Plant Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1950. 11p graph, tables Mi $1.75, Ph $2.50. PB 104151

An unfired ceramic coating capable of protecting 4140 alloy steel from excessive oxidation while being heat treated for 6 hr at 2000°F has been developed. Clay slips composed of flint, ball clay, and kaolin, together with various ceramic oxides, were prepared by milling with water for 2 hr. Uncoated and coated steel specimens were heat treated and the protective qualities of the coatings were evaluated. The addition of 25% carbonyl iron resulted in a coating more easily removed after heat treating. The application of a thin coating of glaze over the surface of the dried coating improved its protective quality. The coatings are not tightly adherent to the metal, but require light pounding for removal. Report no. 20, University of Illinois. Dept. of Ceramic Engineering under USAF Contract no. W33-038-ac-14520. AAF TR 6079. ILU DCE MR 20.

CERAMIC-METAL BODIES, by John H. Koenig. U. S. Air Materiel Command. Engineering Division. Power Plant Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1949. 11p photos, drawings Mi $1.75, Ph $2.50. PB 104164

A method is introduced for evaluating tensile testing methods of ceramic materials by photo-elastic studies of an annealed glass rod in tension. The problem of proper axial loading becomes increasingly important, owing to induced stresses caused by misalignment of specimen grips when testing ceramic materials in tension. The technique affords a method of evaluating the alignment effects and methods of gripping. The material investigated was the MgO-TiN-NiO cermet body; the chuck grips were found to be unsatisfactory for use on the tensile testing machine. Report no. 17 prepared by New Jersey Ceramic Research Station, Rutgers University, New Brunswick, N. J. under USAF Contract no. W33-038-ac-15800. Quarterly report no. 4, April 1, 1949 - July 1, 1949. Project MX-1035. See also PB 104140-PB 104142,104148-PB 104149. NJCRS 17. AAF TR 6049.

CERAMIC METALLOID-METAL BODIES, by J. H. Koenig, L. D. Hower, Jr. and R.B. Sosman. U. S. Air Materiel Command. Engineering Division. Power Plant Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1950. 8p photo, diagr, tables Mi $1.25, Ph $1.25. PB 104141

The variations in transverse strength of "cermet" bodies of the MgO-TiN-Ni series were studied under varying conditions of composition, thermal shock and high (oxidizing) temperature. In order to determine the effect of an oxidizing atmosphere on the transverse strength a group of bars were subjected to periods of 3,6,12,18, and 24 hr of oxidizing atmosphere in a gas-fired furnace. All specimens were then thermal shocked in an electric furnace having virtually neutral atmospheric conditions. It was concluded that a certain amount of oxidation definitely improved the strength of cerment bodies in the MgO-TiN-Ni system. It was recommended that the system be further investigated to determine the optimum composition from the standpoint of strength and resistance to oxidation. Report 21 prepared by New Jersey Ceramic Research Station, Rutgers University, New Brunswick, N. J. under USAF Contract No. W33-038-ac-15800. This report is a direct continuation of AF Technical report no. 6051. See also PB 104140, PB 104142, PB 104148-PB 104149, PB 104164. NJCRS 21. AAF TR 6070.

EFFECT OF THERMAL TREATMENT ON THE DIELECTRIC PROPERTIES OF CERAMIC BODIES. TECHNICAL REPORT NO. 1, APRIL 1, 1949-JUNE 1, 1950, by E. M. Tuttle and H. H. Wilson. North Carolina State College. Dept. of Engineering Research, Raleigh, N. C. Jun 1950. 58p photos, diagrs, graphs, tables Mi $2.75, Ph $7.50. PB 104153

An investigation of the effect of thermal treatment on the dielectric properties of ceramic bodies was continued, with studies on the development of ferro-electric crystals in glasses, and on the effect of devitrification on the dielectric properties of a soda-lime-silica glass. Preliminary experiments were completed to ascertain the degree to which the effect of thermal treatment of a glassy medium may be reflected in dielectric properties. Glasses were developed which devitrify to form sodium metatantalate, and the rate of growth of the sodium metatantalate crystals was determined. The ability of these crystals surrounded by glass to show ferroelectric properties was investigated. The dielectric constant and power factor was determined for a soda-lime-silica glass which was heated for various periods of time at its temperature of maximum rate of crystal growth. Contract no. N8onr-66502, Project designation no. NR 032316.

HIGH ALUMINA CEMENT. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station, Watford, Eng. Feb 1951. 6p graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.05. PB 103689

1. Cements, Alumina - Properties - Gt. Brit. 2. DSIR BRD 27.

PERSONNEL APTITUDE TESTING

PERSONNEL SELECTION AND CLASSIFICATION PROCEDURES: SPATIAL TESTS, A FACTORIAL ANALYSES, by Merrill F. Roff. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jan 1951. 51p tables (1 fold) Mi $2.75, Ph $7.50. PB 103534

1. Pilots, Air - Ability tests 2. Pilots, Air - Mental tests 3. Pilots, Air - Selection 4. AAF SAM Project no. 21-29-002. Final report.

Second report. See PB 110001 for first report.

PILOT STUDY OF A B-50 AIR CREW, BY CARROLL L. SHARTLE, JOHN K. HEMPHILL, ROBERT W. HITES, EDWARD BRUNER OF PERSONNEL RESEARCH BOARD, RESEARCH FOUNDATION, OHIO STATE UNIVERSITY UNDER CONTRACT AF 33(038)-10105. U. S. Air Force. Human Resources Research Laboratories, Bolling Air Force Base, Washington, D. C. Feb 1951. 33p Mi $2.25, Ph $5.00. PB 103792

1. B-50 (Airplane) 2. Personnel, Flying - Psychiatric records 3. Pilots, Air - Performance records 4. Ohio State University Research Foundation, Columbus, Ohio.

PHOTOGRAPHIC AND OPTICAL GOODS

ON THE USE OF THE ROTATING SECTOR IN ASTRONOMICAL PHOTOMETRY, by T. J. Lauroesch. May 1949. 57p photos, diagrs, graphs, tables Mi $2.75, Ph $7.50. PB 103642

An investigation has been made of reciprocity-law failure and intermittency effect in the field of photography and evaluation of the possibilities of using the rotating sector as an instrument of astronomical photometry. Curves of reciprocity law failure for Eastman 103a-O and 103a-E plates were produced from data obtained under conditions of astronomical photometry, utilizing in-focus stellar images. It appears that these results are in reasonable agreement with results obtained by the manufacturer in laboratory investigations using densiometric methods. The structural characteristics of apparatus for investigating in-focus stellar images were studied. A sector-disk was designed for the three-inch Ross-Fecker camera for the purpose of investigating intermittency effect for in-focus stellar images. However, no plates were taken using this instrument. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

PHYSICS

General

COMPARATIVE STUDY OF MOMENTUM TRANSFER, HEAT TRANSFER, AND VAPOR TRANSFER. PT. I: FORCED CONVECTION, LAMINAR CASE, BY C. S. YIH. PREPARED FOR THE OFFICE OF NAVAL RESEARCH, NAVY DEPT., UNDER ONR CONTRACT NO. N9ONR-82401,NR063-071/1-19-49. Colorado. Agricultural and Mechanical College. Civil Engineering Dept., Fort Collins, Colo. Report no. 1. Sep 1950. 55p graphs, tables Available from Civil Engineering Dept., Colorado A & M. College, Fort Collins, Colo. PB 104251

1. Boundary layer, Laminar - Theory 2. Boundary layer, Laminar - Temperature distribution 3. Boundary layer, Laminar - Velocity distribution 4. Mathematical equations and solutions 5. Karman-Pohlhausen method (Boundary layer computation) 6. Vapor pressure.

For pt. III see PB 104252.

COMPARATIVE STUDY OF MOMENTUM TRANSFER, HEAT TRANSFER, AND VAPOR TRANSFER. PT. III: FREE CONVECTION, BY C. S. YIH. PREPARED FOR THE OFFICE OF NAVAL RESEARCH, NAVY DEPT., UNDER ONR CONTRACT NO. N90NR-82401, NR063-071/1-19-49. Colorado. Agricultural and Mechanical College. Civil Engineering Dept., Fort Collins, Colo. Report no. 3. Feb 1951. 34p graphs Available from Civil Engineering Dept., Colorado A & M College, Fort Collins, Colo. PB 104252

1. Boundary layer, Laminar - Theory 2. Boundary layer, Laminar - Temperature distribution 3. Boundary layer, Laminar - Velocity distribution 4. Mathematical equations and solutions.

For pt. I see PB 104251.

MATHEMATICAL INVESTIGATION OF THE BOUNDARY LAYER FLOW PROBLEM THROUGH THE KARMAN-POHLHAUSEN METHOD, by Leonard C. MacAllister. May 1949. 91p diagrs, graphs Mi $4.25, Ph $12.50. PB 103667

A mathematical investigation is made of the boundary layer flow problem through the Karman-Pohlhausen method. The flow in the viscous layer of an ellipsoid based on the theoretical pressure distribution is computed. Results of the problem indicate that, due probably to the choice of a large fineness ratio for the ellipsoid, the Karman-Pohlhausen method seems to give reasonable results for this particular case. The analysis does not indicate directly where the Karman-Pohlhausen method fails in cases where it has been unsuccessful, but some indications are pointed out.

Nuclear

ATOMKARNAN SOM ENERGIKÄLLA (ATOM NUCLEUS AS SOURCE OF ENERGY), by Erik Rudberg. 1946. 20p photo, diagrs, graphs (Text in Swedish) Mi $1.75, Ph $2.50. PB 103710

1. Atomic power - Research - Sweden.

Reprinted from Blad för bergshandteringens vänner, hft. 1, 1946, p. 285-304.

PSYCHOLOGY

FACTOR-ANALYTIC STUDY OF CREATIVE THINKING. I. HYPOTHESES AND DESCRIPTION OF TESTS. STUDIES OF APTITUDES OF HIGH-LEVEL PERSONNEL, by J. P. Guilford, R. C. Wilson, P. R. Christensen and D. J. Lewis. University of Southern California. Psychological Laboratory, Los Angeles, Calif. Apr 1951. 26p photo, diagrs Mi $2.00, Ph $3.75. PB 103856

This paper reports the first phases of an attempt to isolate and define abilities which may be important in the domain of creative thinking, particularly as it applies to science, engineering, and invention. Reports no. IV, Apr 1951. Contract N6onr-23810. For report no. 3 see PB 103857. UCLA PL no. 4.

FACTOR-ANALYTIC STUDY OF REASONING ABILITIES. II. ADMINISTRATION OF TESTS AND ANALYSIS OF RESULTS. STUDIES OF APTITUDES OF HIGH-LEVEL PERSONNEL, by J. P. Guilford, R. F. Green, and P. R. Christensen. University of Southern California. Psychological Laboratory, Los Angeles, Calif. Apr 1951. 27p tables Mi $2.00, Ph $3.75. PB 103857

This is the concluding portion of the first of a series of studies designed to explore abilities considered to be important in the success of high-level personnel. In this study an attempt was made to isolate and to define factors underlying performance in the domain of reasoning. For this study, reasoning has been tentatively defined as thinking activity that is directed toward solving a problem in which the solution or manner of solution is unknown or not immediately obvious to the reasoner. Reports, no. III. Project 150-044 under contract N6onr-238-10. For report no. 4 see PB 103856. UCLA PL no. 3.

PREDICTION OF ELIMINATION FROM BASIC PILOT TRAINING FOR REASONS OTHER THAN FLYING DEFICIENCY, by Ernest C. Tupes and John A. Cox. U. S. Air Force. Human Resources Research Center, Lackland Air Force Base, San Antonio, Texas. Feb 1951. 30p tables Mi $2.00, Ph $3.75. PB 103444

1. Pilots, Air - Selection 2. Pilots, Air - Training 3. Psychology, Aviation 4. AAF HRRC RB 51-1.

Project no. 21-03-028. Appendix B not included.

PSYCHOLOGY AND MILITARY PROFICIENCY. A HISTORY OF THE APPLIED PSYCHOLOGY PANEL

OF THE NATIONAL DEFENSE RESEARCH COMMITTEE, by Charles W. Bray. 1948. 259p photos, diagrs, drawings, map, graphs, tables Available from Princeton University Press, Princeton, New Jersey $3.50 PB 102896

1. Psychology, Military 2. Psychology, Applied.

REPORT EVALUATING LEADERSHIP POTENTIAL OF PRE-FLIGHT NAVCADS, PREPARED by Charles P. Sparks and Harold A. Edgerton. Richardson, Bellows, Henry & Co., Inc., New York, N. Y. Mar 1951. 35p graphs, tables Mi $2.25, Ph $5.00. PB 103569

1. Leadership 2. Pilots, Air - Ability tests 3. Psychology, Aviation - Tests.

RUBBER AND RUBBER PRODUCTS

FRACTIONATION OF LIQUID POLYISOPRENE POLYMERS, by Y. Conwell and A. V. Tobolsky. Princeton University. Plastics Laboratory. Sep 1949. 22f graphs, tables Mi $2.00, Enl Pr $5.00. PB 103411

1. Polyisoprene, Liquid - Preparation 2. Rubber - Plasticity 3. PU PL TR 15C 4. SIG Contract W36-039-sc-32011.

Contract W36-039-sc-32011. Dept. of the Army project: 3-99-15-022. Signal Corps project: 152B.

LATEX-KONSERVIERUNG (PRESERVATION DURING STORAGE OF PERBUNAN LATEX), by Dr. Dennstedt. I. G. Farbenindustrie A. G., Schkopau, Ger. Jul 1938. 10f graph, tables (Text in German) Mi $1.25, Enl Pr $2.50. PB 103327

1. Perbunan (Trade name) 2. Igetex (Trade name) 3. Rubber, Latex - Storage - Germany 4. Micro BIOS FD 3686/48, Frames 1-9.

English abstract included. Abstract available as PB 103327s. 1p. Mi $1.25, Ph $1.25.

IGETEX N, by Dr. Boecklin. I. G. Farbenindustrie A. G., Leverkusen, Ger. Jun 1943. 3f table (Text in German) Mi $1.25, Enl Pr $1.50. PB 103326

1. Igetex N (Trade name) 2. Rubber, Latex - Polymerization - Germany 3. KAUTEKO (Anwendungstechnische Kommission für Kautschuk) 4. Micro BIOS FD 3685/48, Frames 1-2.

English abstract included. Abstract available as PB 103326s. 1p. Mi $1.25, Ph $1.25. Report to the Kauteko June 2, 1943.

UNTERSUCHUNGEN AN IGETEX-LATEX (EXPERIMENTS WITH IGETEX LATEX), by Dr. Meyer. I. G. Farbenindustrie A. G., Schkopau, Ger. Aug 1941. 12f graphs (Text in German) Mi $1.75, Enl Pr $3.75. PB 103328

1. Igetex (Trade name) 2. Mesapon N (Emulsifier) 3. Nekal BXG (Amplifier) 4. Rubber latices - Particle size - Germany 5. Rubber, Latex - Polymerization - Germany 6. Micro BIOS FD 3687/48, Frames 10-20.

English abstract included. Abstract available as PB 103328s. 1p. Mi $1.25, Ph $1.25.

STRUCTURAL ENGINEERING

APPLICATION OF ELASTIC-CURVE TRANSVERSE METHOD TO MEMBERS HAVING STRAIGHT HAUNCHES, by LeRoy Francis Nichalson and Albion William Walton, Jr. Jun 1949. 58p diagrs, tables Mi $2.75, Ph $7.50. PB 103654

A system has been devised by which the general Elastic-Curve Transverse method could be readily applied to the analysis of indeterminate structures made up of straight-haunched members subjected to concentrated loading and to end moment loading. The method is based on the same assumptions as the other so-called classical methods. This method possesses the following advantages: It gives a rough picture of what the deflected structure looks like; does not require that formulas be memorized or copied, or complicated sign conventions used; saves time in the construction of influence lines; simplifies and clarifies the distribution of sidesway moments; and is of great value in the analysis of multi-story and complex frames. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

BUCKLING OF SANDWICH CYLINDERS, by Chi-Teh Wang. New York University. College of Engineering. Daniel Guggenheim School of Aeronautics. Aug 1949. 42f diagr Mi $2.50, Enl Pr $7.50. PB 103418

A large deflection theory has been formulated for sandwich cylindrical shells of any cross section and the buckling problem of a circular sandwich under compressive load is solved. Sandwich type structural elements are important in high-speed aircraft as the surface of the plane must be smooth without buckling, a requirement which the ordinary thin-sheet-stringer type of construction cannot meet without sacrificing weight. It was ascertained that the critical stresses for symmetrical and unsymmetrical buckling are the same in the case of homogeneous shells. In the sandwich type of structure, however, the unsymmetrical buckling stress is lower than the symmetrical buckling stress. Test results show that the theoretical critical stress is in good agreement with the experimental one. Contract N6onr-279.

COMPARISON OF THEORETICAL AND EXPERIMENTAL RESPONSE OF A SINGLE-MODE ELASTIC SYSTEM IN HYDRODYNAMIC IMPACT, by Robert W. Miller and Kenneth F. Merten. U. S. National Advisory Committee for Aeronautics. Apr 1951. 22p photos, diagr, graphs, table Mi $2.00, Ph $3.75. PB 103507

Hydrodynamic impact tests were made on an elastic model approximating a two-mass - spring system which had a ratio of sprung mass to hull mass of 0.6 and a natural frequency of 3.0 cycles per second. Tests were made at two combinations of trim and flight-path angles and for a range of flight-path velocity. Comparison of the experimental results with results obtained from the theory showed good agreement. NACA TN 2343.

DEVELOPMENT AND PRODUCTION OF EXPERIMENT HIGH-STRENGTH FERRITIC ELECTRODES. PROGRESS REPORT 4TH, FEB 1, 1948 ON CONTRACT W-33-019 ORD 6269, SUBPROJECT TB4-30A, by F. M. Lucas, P. J. Rieppel, and C. B. Voldrich. Battelle Memorial Institute, Columbus, Ohio. Feb 1948. 100f photos, diagrs, graphs, tables Mi $4.25, Enl Pr $13.75. PB 103422

1. Electrodes, Ferritic 2. UE-41 (Metal) 3. Armor plate - Tests 4. Joints, Welded - Tensile tests.

Report G-1150-1. For 9th report, July 1949, see PB 103391.

DEVELOPMENT AND PRODUCTION OF EXPERIMENTAL HIGH-STRENGTH FERRITIC ELECTRODES. PROGRESS REPORT, 9TH, FEB 1 TO JULY 1, 1949 ON CONTRACT W33-019 ORD 6269, by S. A. Wenk, P. J. Rieppel, C. B. Voldrich. Battelle Memorial Institute, Columbus, Ohio. Jul 1949. 30f diagrs, graphs Mi $2.00, Enl Pr $5.00. PB 103391

Progress achieved in slow-bend tests on Grade-A armor plate to determine the qualification of this kind of testing for studies of weld-joint toughness is reported in association with a program for the development and production of experimental high-strength ferritic electrodes. The work included Charpy-bar transition-temperature tests of slack-quenched and fully quenched armor to check the sensitivity of slow-bend testing; slow-bend tests of full-thickness plates of the same steels using various type notches in specimens of similar size to that contemplated for the joint-toughness tests of welded plate; and slow-bend transition-temperature tests of full-size specimens. The results are plotted in absorbed energy vs. temperature diagrams in the form of comparative notched-bar and yield-strength curves. Load-deflection curves are also given. For 4th report see PB 103422.

FIRE RESISTANCE OF NON-LOAD-BEARING EXTERIOR WALLS. PROCEEDINGS, 2D RESEARCH CORRELATION CONFERENCE, NOV 21, 1950. Building Research Advisory Board. Feb 1951. 75p Available from Building Research Advisory Board, National Research Council, Washington 25, D. C. $3.50. PB 103700

BRAB Conference report no. 2, Carl F. Boester, Chairman. Contents: Background of requirements for fire resistance of exterior non-load-bearing walls, by George N. Thompson. - The wall, what do we want? by J. Walter Severinghaus. - View-point of the research director, by Robert L. Davison. - Costs of exterior non-load-bearing walls, by J.P.H. Perry. - Viewpoint of the code official, by Emil J. Szendy. - Fire hazards and fire protection, by James K. McElroy. - Proposed restrictions for exterior non-load-bearing walls with respect to fire safety, by John W. Dunham. - Sandwich-type spandrel wall, by Nolan D. Mitchell.

INVESTIGATION OF SOILS AND BUILDING TECHNIQUES FOR RAMMED-EARTH CONSTRUCTION, by Edsel J. Burkhart. Texas. Engineering Experiment Station, College Station, Texas. May 1949. 32p photos Available from Texas Engineering Experiment Station, College Station, Texas. PB 103672

It is the purpose of this initial report to acquaint interested persons with the scope of work undertaken and in progress, its possibilities and limitations, and the results of experimentation to date. TU EES RR 6.

INVESTIGATIONS ON BUILDING FIRES. PART IV: FIRE RESISTANCE OF TIMBER DOORS, by C. J. Webster and L. A. Ashton. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station, Watford, England. Sep 1950. 30p photos, diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 103264

1. Doors, Wooden - Fire resistance - Gt. Brit. 2. Fires - Investigations - Gt. Brit. 3. DSIR NB TP6. S. O. Code no. 47-551-6. For pt. 1 see PB 110264, for pt. 3 see PB 103185.

METHOD OF APPLICATION OF MOMENT DISTRIBUTION TO THE SOLUTION OF ARCHED BENTS WITH A VARYING MOMENT OF INERTIA, by John Mascenik. May 1949. 57p diagrs Mi $2.50, Ph $6.25. PB 103638

This thesis provides the constants required to solve a rigid frame whose curved top member's moment of inertia varies as the secant of the angle alpha for various rise/span ratios. A parabolic arch whose moment of inertia varies with the secant of the angle alpha and whose rise/span values are 0.04, 0.08, 0.20, 0.30 and 0.40 is dealt with. It is stated that other arches should be solved with varying moments of inertia. This would save a great deal of time and energy. Furthermore, it was found that shear is constant for all spans; thrust varies directly as the length of span and inversely as the rise; and that the absolute stiffness varies inversely as the span. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

NUMERICAL APPROACH TO THE INSTABILITY PROBLEM OF MONOCOQUE CYLINDERS, by Burno A. Boley, Joseph Kempner, and J. Mayers. U. S. National Advisory Committee for Aeronautics. Apr 1951. 43p photos, drawings, graphs, tables Mi $2.50, Ph $6.25. PB 103540

Two closely related numerical methods which employ operations tables have been developed and used in the calculation of the buckling load of a monocoque cylinder subjected to pure bending. They are based on the assumption of a simplified structure which includes only the most highly compressed portion of the cylinder. The first method makes use of a 14-row determinant, the second a 10-row determinant. The buckling loads of three cylinders with widely different characteristics were calculated by these methods. Reasonable agreement with experiment was obtained. A procedure similar to the first method was developed for a calculation of the buckling load of a cylinder with a cutout. A limited experimental check was obtained. NACA TN 2354.

ON SYMMETRICAL PURE BENDING OF BEAMS. PART I AND APPENDICES I-III, by Aris Phillips. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Aug 1949. 44f diagrs, graphs, tables Mi $2.50, Enl Pr $7.50. PB 103408

A simple method is given for finding the relation between the bending moment and the maximum strain which this bending moment produces in the cross section of a beam in the case of symmetrical pure bending. The theoretical solution is derived step-by-step for both the plastic and the elasto-plastic cases. The method considered has the accuracy of Nadal's method, while at the same time is scarcely more complicated than Cozzone's method. Contract N6-onr-251. Task order 11 (NR 035-240). For part II see PB 103409. SU ME TR 14.

ON SYMMETRICAL PURE BENDING OF BEAMS. PART II, by Aris Phillips. Stanford University, Dept. of Mechanical Engineering, Stanford, Calif. Oct 1949. 20f diagrs Mi $1.75, Enl Pr $3.75. PB 103409

1. Beams - Stress analysis 2. SU ME TR5. Contract N6-onr-251. Task order 11 (NR035-240). For part I and appendices see PB 103408.

PRELIMINARY ANALYSIS AND DESIGN OF A SMALL SUPERSONIC WIND TUNNEL, by John L. Cummings. Jan 1949. 100p diagrs, graphs, tables Mi $4.25, Ph $12.50. PB 103499

Two designs for a small, supersonic wind tunnel are presented. Air Flow is provided by a supercharger that is gear driven by an aircraft engine operating at sea-level conditions. Computations are performed assuming adiabatic flow throughout the tunnel with the exception of the cooling unit. A normal shock wave is assumed to occur after the test section. The results include the test section area, the temperature and pressure, the horsepower required, the required supercharger pressure rise, and the cooling required for each of four Mach numbers. The effect of supercharger inlet pressure is shown in the first design. In the second design the effect of a fixed second throat is shown with and without a fixed second throat installed in the tunnel. A test-section area of 19.7 sq. in. could be used at optimum Mach number of 2.5 with a second throat installed. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

PRODUKTIONSTEKNISK FORSKNING I NORDEN. FÖREDRAG HALLNA VID NORDISK BYGGNADSFORSKNINGSMÖTE II I STOCKHOLM 1950 (RESEARCH ON BUILDING ECONOMY AND PRODUCTION TECHNIQUE IN DENMARK, FINLAND, NORWAY AND SWEDEN. SHORT PAPERS READ AT THE NORTHERN CONGRESS ON BUILDING RESEARCH II IN STOCKHOLM 1950) WITH A SUMMARY IN ENGLISH. REDIGERAD AV CHR. BRING OCH K. STENSLAND JUNKER. Sweden. Statens Kommittee för Byggnadsforskning. 1950. 77p photos, graphs (Text in Swedish and English) Mi $3.50, Ph $10.00. PB 103450

1. Building - Research - Sweden 2. Building - Congresses - Sweden 3. Sweden. Statens Kommittee för Byggnadsforskning. Rapporter nr. 21.

Contents: Byggnadsekonomisk forskning i Finland (Research on building economy in Finland) by Ole Gripenberg.-Merkostna for vinterarbeten på husbyggen (Extra costs of winter work in house building) by Bertil Näslund.-Byggnadselementens varaktighet (Durability of various elements of a building) by Knut Bildmark.-Er vore bygninger rationelt dimensionerede, nar hensyn tages till såvel anlaegs-som driftsomkostninger? (Have our buildings rational proportions with respect to both costs of erection and running costs?) by Niels M. Plum.-Byggnadsindustrins arbetsledareproblem (Site supervision problems in the building industry) by Mejse Jacobsson.-Exempel på nyare arbetsmetoder och hjälpanordningar på byggnadsplatsen (Examples of recently introduced working methods and auxiliary facilities on the site) by David Österberg.-Tariffer og maskiner (Building machines and piecework rates) by Niels Christensen.-Byggnadshissen och transportarbetet (Hoisting building materials) by Göran Bjursten.-Distributions-problem inom byggämnesindustrin (Problems of distribution in the building materials industry) by Nils Tengvik.

PROTECTION OF BUILDINGS AND TIMBER AGAINST TERMITES, by W. D. MacGregor. Gt. Brit. Dept. of Scientific and Industrial Research. Forest Products Research Laboratory, Aylesbury, England. Oct 1950.

1. Termites - Eradication - Gt. Brit. 2. Buildings - Termite protection - Gt. Brit. 3. Timber - Termite protection - Gt. Brit. 4. DSIR FPR 24.
S. O. Code no. 47-68-24.

SCOTTISH HOUSING HANDBOOK, 3: HOUSE DESIGN. Gt. Brit. Dept. of Health for Scotland. 1950. 7p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.15. PB 103222

1. Housing - Design - Scotland.
S. O. Code no. 49-347-3.

SEMI-GRAPHICAL METHOD FOR FINDING DEFLECTIONS IN STATISCALLY INDETERMINATE BEAMS, by Robert Elmer Scatchard. Jun 1949. 45f graphs Mi $2.50, Enl Pr $7.50. PB 103431

A semi-graphical method is presented for finding deflections in statically indeterminate beams. The method was developed to eliminate much of the labor usually associated with this problem to give a visual indication of the actual deflection in the structure. The method employs both moment distribution and graphical calculus for finding the deflections in the beams. A number of typical problems are solved to illustrate the use of the method. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

SINUSOIDAL BUCKLING OF ANGLE BARS WITH BENDING LOADS AS A PLATE PROBLEM, EXACT SOLUTION, by H. J. Plass. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Oct 1949. 25f diagr, graphs Mi $2.00, Enl Pr $5.00. PB 103413

In a previous report, it was shown how an exact solution in plate theory could be obtained for the angle bar under bending such that the free fibers are under compression, the vertex in tension. Because the amount of calculation needed was considered to be excessive, the exact solution was not carried out. Approximate values of critical buckling loads were obtained by means of the Rayleigh-Ritz method. In this report, the approximate values are used as a guide to limit the amount of calculation for the exact solution. The method of computation is explained in detail, and the critical load is found for three width to length ratios of the bar flanges. An investigation of the shape of the cross section after buckling is also made. Contract N6-onr-251, Task order 12 (NR035-241). SU ME TR 4.

STEEL COLUMNS: SURVEY AND APPRAISAL OF PAST WORKS, by A. A. Jakkula and Henson K. Stephenson. Texas. Engineering Experiment Station, College Station, Texas. Jun 1947. 121p diagrs, tables Available from Texas. Engineering Experiment Station, College Station, Tex. PB 103684

This bulletin presents a bibliography of all the more important previous analytical and experimental works on the subject; a detailed summary of the more important tests that have been made on metal columns; a discussion of these tests and data; a brief review of the literature on compression members; a digest of past and current opinion of the column problem and design procedures; and a partial study of the correlation between test results and the Secant formula. Publication date July 1949. Publication resulting from the cooperative investigation of bridge types by the Public Roads Administration and Agricultural and Mechanical College of Texas. This material was prepared as Bulletin 91, 1946, but was delayed until July 1949. Additional material is included which carries

the bibliography into 1949. Agricultural and Mechanical College of Texas. Bulletin ser. 5, v. 3, no. 6, June 1, 1947. TU EES B 91.

STUDY OF THE EFFECT OF A SEMI-FLEXIBLE CONNECTION IN ARTICULATED WEDGE-BEAM FRAMING, by Luther Taylor Chesnut, 3rd and Paul Otto Gaddis. Jun 1949. 95f photos, diagrs, graphs, tables Mi $4.25, Enl Pr $13.75. PB 103429

The effect of a semiflexible welded connection acting in a single-span steel rigid frame is determined and a comparison made of the action of an articulated frame under gravity loading with the action of a semi-articulated frame under the same loading. It was found that the semiflexible welded strap apparently offers less moment resistance than does a so-called true hinge at the crown. In regard to the Amirikian wedge-beam theory, the investigation demonstrates that a semiflexible connection acting in place of a pinned connection will not change the elastic characteristic of the frame appreciably. The small welded strap used in the semi-articulated model took the design load very well, although it was designed exactly at the design limit for the ruling factor of compression. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

UNTERSUCHUNGEN AN DOLOMIT UND TEERDOLOMIT (INVESTIGATION OF DOLOMITE AND DOLOMITE AND TAR MIXTURES), by G. Naeser. Mannesmann Röhrenwerke, Hückingen, Ger. Aug 1944. 11f (Text in German) Mi $1.75, Enl Pr $3.75. PB 103275

1. Bessemer converters - Germany 2. Dolomite brick - Germany 3. Dolomite-tar mixes - Germany 4. Micro BIOS FD 502/50, Frames 1-10.

English abstract included. Abstract available as PB 103275s. 1p. Mi $1.25, Ph $1.25. Untersuchungsbericht no. 20/44.

WALLS, FLOORS AND ROOFS, BY A COMMITTEE CONVENED BY THE ROYAL INSTITUTE OF BRITISH ARCHITECTS. Gt. Brit. Ministry of Works. 1944. 54p Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 103265

1. Building - Gt. Brit. 2. Insulation, Sound - Gt. Brit. 3. MOW PWB S15.

S. O. Code no. 70-441-15-50.

TEXTILES AND TEXTILE PRODUCTS

AIR PERMEABILITY OF WOVEN FABRICS, by Karl Avery Williams, Jr. May 1949. 105f photos, drawings, diagrs, graphs Mi $4.50, Enl Pr $15.00. PB 103433

An apparatus for the measurement of air flow through woven materials has been constructed by modifying a commercial instrument. This apparatus is, essentially, a plug and orifice type flow meter. The mechanism of permeability or air flow was found to be analogous to that of flow through an orifice. Porosity and the size of the opening have an effect on the weight flow of air through the cloth. A cloth most permeable to air weight flow would be one woven on the square with the lowest possible denier yarn. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

COMPARATIVE STUDY OF FUNGAL-RESISTANCE TESTS IN SPECIFICATIONS INVOLVING COTTON GOODS, by James V. Harvey. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Apr 1949. 41p diagrs, tables Mi $2.50, Ph $6.25. PB 103748

To review existing specifications relating to items made wholly or in part of cotton goods for tests involving resistance to attack by microorganisms, and to compare the techniques outlined. QMC MSR 14.

INDUSTRIAL FIBRES, A SUMMARY OF FIGURES OF PRODUCTION, TRADE AND CONSUMPTION RELATING TO COTTON, WOOL, SILK, FLAX, JUTE, HEMP, MOHAIR, COIR AND RAYON. Gt. Brit. Commonwealth Economic Committee. 1951. 164p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25. PB 103266

1. Fibers, Industrial - Production 2. Cotton industry 3. Flax - Production 4. Hem industry 5. Jute fibers 6. Mohair - Manufacture 7. Rayon fibers 8. Silk industry 9. Wool industry.

S. O. Code no. 88-513-0-50.

MECHANICAL PROPERTIES AND THE STRUCTURE OF HAIR, by Cecil E. Reese and Henry Eyring. Utah. University, Salt Lake City, Utah. Nov 1949. 41f diagr, graphs, tables Mi $2.50, Enl Pr $7.50. PB 103424

A simple quantitative method for determining the amount of mechanical strength contributed by the various types of bonds in hair fiber is developed. The effects of various types of reagents such as acids, bases, oxidizing agents, and reducing agents are discussed. The reaction between various chemical agents and hair fibers is of the first order, with respect to the reagent and also with respect to the bonds to be broken. The effect of temperature is also discussed. Using the theory of absolute reaction rates, the heats and entropies of activation for the reaction are calculated. The diffusion coefficient of hydroxyl ion in hair is also calculated, by using Fick's second law of diffusion. Technical report no. XI. Contract N7-onr-45101, Project NR032-168.

NYLON PARACHUTE MATERIALS: STUDY OF METHODS OF SEWING, by E. L. Simpson, Jr. U. S. Naval Aircraft Factory, Philadelphia, Pa. Sep 1949. 12f tables Mi $1.75, Enl Pr $3.75. PB 103416

Attempts have been made to eliminate excessive thread breakages in the sewing of several thicknesses of heavy nylon fabrics or webbing by developing methods of sewing, and to develop suitable nylon sewing threads for use in the construction of all nylon parachutes. Thread breakage encountered in various phases of parachute sewing was practically eliminated by using nylon bonded nylon threads in place of the standard nylon threads, Specification AN-T-9. The use of chromium plated needles further reduced the breakage during the sewing of nylon webbings. NAF M-4879.

SURVEY ON CAUSES AND PREVENTION OF COTTON FIRES. National Board of Fire Underwriters. 1950. 36p photos Available from National Board of Fire Underwriters, 85 John St., New York 7, N. Y. PB 103213

1. Cotton industry - Fire hazards 2. NBFU RR 8. N65. Committee on Fire Prevention and Engineering Standards Research Division.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

ANALYSIS OF THE EFFECTS OF WING INTERFERENCE ON THE TAIL CONTRIBUTIONS TO THE ROLLING DERIVATIVES, by William H. Michael, Jr. U. S. National Advisory Committee for Aeronautics. Apr 1951. 37p diagrs, graphs Mi $2.25, Ph $5.00. PB 103543

An analysis of the effects of wing interference on the tail contributions to the rolling stability derivatives of complete airplane configurations is made by calculating the angularity of the air stream at the vertical tail due to rolling and determining the resulting forces and moments. Some sidewash results are presented for a limited range of wing plan forms and vertical-tail sizes. Equations for using the sidewash results to determine the tail contributions to the rolling derivatives are given and some comparisons with experimental data are made. NACA TN 2332.

ANNUAL REPORT, 34TH, 1948 INCLUDING TECHNICAL REPORTS NOS. 892-921. U. S. National Advisory Committee for Aeronautics. 1951. 653p photos, drawings, diagrs, graphs, tables Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $3.50. PB 103267

1. Aeronautical research 2. Aeronautics - Yearbooks 3. NACA 892-921.

CAMBER DERIVATIVES AND TWO-DIMENSIONAL TUNNEL INTERFERENCE AT MAXIMUM LIFT, by R. C. Pankhurst and H. H. Pearcey. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Apr 1950. 5p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.25. PB 103126

Discussion concerns the corrections due to lift effect in tunnel tests of an aerofoil in two-dimensional flow. S. O. Code no. 23-9006-28. ARC CP 28.

EFFECT OF A 45-DEGREE ANGULAR DISPLACEMENT OF THE TAIL SURFACES OF A CONVENTIONAL SYMMETRICAL CRUCIFORM TAIL SECTION ON THE POWER-OFF LONGITUDINAL STABILITY CHARACTERISTICS OF SUPERSONIC AIRCRAFT, by Robert E. Bower. Jun 1949. 108p diagrs, graphs, tables Mi $4.50, Ph $13.75. PB 103488

The change in power-off longitudinal stability characteristics of a supersonic airplane with a cruciform tail surface rotated from a position with lifting surfaces at 0° and 90° to the horizontal plane of symmetry (plane of wing) to a position where the surfaces are each 45° to the plane of the wing were analyzed. The static maneuvering stability of a 45° tail-type configuration is increased over that of the 0° tail-type. The trim static speed stability and the phugoid static speed stability of an airplane are increased by incorporating a 45° cruciform tail section. The short period stability mode is relatively independent of tail configurations - the 0° type tail having slightly greater damping characteristics. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

EFFECT OF TAIL SURFACES ON THE BASE DRAG OF A BODY OF REVOLUTION AT MACH NUMBERS OF 1.5 AND 2.0, by J. Richard Spahr and Robert R. Dickey. U. S. National Advisory Committee for Aeronautics. Apr 1951. 21p photos, graphs Mi $2.00, Ph $3.75. PB 103600

A wind-tunnel investigation was made of the effect of rectangular plan-form tail surfaces on the base drag of an unboattailed body of revolution having a turbulent boundary layer. The addition of the tail surfaces having the trailing edges at or near the base of the body resulted in a large increase in the base drag. As the tail trailing edge was moved forward or rearward of the base by about one tail-chord length, this base-drag increase was reduced to nearly zero. The increment in base drag due to the presence of the tail surfaces decreased with increasing Mach number but increased when the number of tail surfaces or the thickness of the tail surfaces was doubled. NACA TN 2360.

EFFECT OF TAPER ON THE DOWNWASH ANGLE FROM WINGS WITH LARGE SWEEP AND LOW ASPECT RATIO, by Samuel Kraus. Jun 1949. 74p photos, graphs, tables Mi $3.50, Ph $10.00. PB 103643

The effect of taper on downwash angles was measured behind three wings of aspect ratio 1.5, quarter-chord line swept-back 60°, and with taper ratios of 1.0, 0.5, and 0. The measurements were made along a horizontal line normal to the wind tunnel axis, 2.4 spans behind the intersection of the wing quarter-chord line and wing center line, and .05 spans below the extended wing plane. Tests indicate an approximately elliptical lateral variation of downwash angle, with possibly a dip behind the wing centerline, essentially unchanged by taper ratio. The values of downwash calculated by Gale's method indicate a different lateral variation which is strongly affected by taper ratio. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

EXPERIMENTAL INVESTIGATION OF THE EFFECT OF ASPECT RATIO UPON THE AERODYNAMIC CHARACTERISTICS OF SWEPT-BACK WINGS AT LOW SPEEDS, by Richard Bumstead. Jan 1949. 51p photos, diagrs, graphs Mi $2.75, Ph $7.50. PB 103486

Low speed characteristics such as, the slope of the lift curve below the stalling angle, the maximum lift coefficient, the maximum lift-drag ratio, and the minimum drag coefficient were determined of two untapered sweptback wings having various AR for each of two sweep angles, 30° and 45°, at a conventional Reynolus No. of 600,000. The slope of the lift curve decreased as the aspect ratio was decreased. The maximum lift coefficient of the 45° swept wing had a minimum value at an AR of about 2-1/2, while the $C_{L_{max}}$ decreased slightly with increasing AR for the 30° swept wing. The maximum lift-drag ratio of the swept wings decreased with decreasing AR. The flow near the top surface of the sweptback wings had an outward component of velocity toward the tips for positive angles of attack. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

FUEL TANK VENT SYSTEMS FOR AIRCRAFT HAVING HIGH RATES OF DESCENT, by F. J. Bigg. Gt. Brit. Royal Aircraft Establishment, Farnborough, England. Dec 1948. 10p graphs, tables Mi $1.25, Ph $1.25. PB 103651

Altitude chamber tests have been made on a representative aircraft fuel tank vent system to determine the depression relative to atmospheric pressure occurring in the tank of an aircraft descending rapidly from an altitude of 40,000 ft. The tank complete with its vent pipe was mounted in a large altitude chamber, which was evacuated until its internal pressure corresponded to 40,000 ft altitude. A sliding plate valve, covering the inlet of a pipe attached to the chamber was then opened progressively so that the chamber pressure increased to correspond to a uniform rate of descent to ground level. Each descent was started at 40,000 ft and the rates of descent ranged from 20,000 to 40,000 ft/min. The 390 gallon tank was tested empty and partially filled with paraffin so that the airspace was reduced to 200 gal. The test conditions are given in a table. The results show that a depression sufficient to collapse the tank can result with present tanks and vent systems. Tech. note, Mech. Eng. 27.

LIFT AND DRAG CHARACTERISTICS OF AN OSCILLATING WING DETERMINED EXPERIMENTALLY, by Henry J. Gondarowski. Jun 1949. 40p photos, diagrs, graphs, tables Mi $2.50, Ph $6.25. PB 103590

Aerodynamic tests were conducted on a standard symmetrical airfoil while it was oscillating about an axis parallel to the span at the following values of k: 0, 0.205, 0.251, 0.362. The results are presented as curves of average coefficient of lift, coefficient of drag, and lift over drag versus the mean angle of attack. Comparisons were made with the trends predicted by theoretical analysis of an oscillating wing. The oscillations were made sinusoidal to agree with the assumed type of variation and the amplitude was kept constant at 5.5^{o}. In most respects the experimental trends compared favorably with the theoretical trends. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

METHOD FOR CALCULATING DOWNWASH FIELD DUE TO LIFTING SURFACES AT SUBSONIC AND SUPERSONIC SPEEDS, by Sidney M. Harmon. U. S. National Advisory Committee for Aeronautics. Apr 1951. 50p diagrs, graphs Mi $2.00, Ph $3.75. PB 103402

A method utilizing source singularities is presented for obtaining the linearized downwash field due to lifting wings at subsonic and supersonic speeds. The method is applied to derive generalized formulas for the downwash field due to uniformly loaded swept and rectangular wings at subsonic and supersonic speeds. The utilization of these formulas to obtain the downwash due to wings of arbitrary loading is indicated. NACA TN 2344.

METHOD FOR PREDICTING LANDING GEAR LOADS OF AIRPLANES EQUIPPED WITH TANDEM WHEEL LANDING GEAR, by Edward H. Kramer. U. S. Air Materiel Command. Engineering Division. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1949. 35p graphs, tables Mi $2.25, Ph $5.00. PB 103598

A method is presented for predicting landing gear loads of airplanes equipped with tandem wheel landing gear, as well as a correlation of the results of a sample computation with experimental data. The basic problem involved in the prediction of the landing gear loads of a tandem wheel gear is the computation of the dynamic response of an elastic structure to a series of impact loads. In the given method of analysis this problem is solved by computing the dynamic response of the structure to each impact separately, and then graphically adding these responses together with due regard to their time relationship to one another. AAF TSEAC MR 4595-8-9.

OSCILLATING WINGS OF FINITE ASPECT RATIO, by P. Chiarulli. Brown University. Graduate Division of Applied Mathematics. Dec 1949. 29f graphs, tables Mi $2.00, Enl Pr $5.00. PB 103423

An attempt was made to obtain a comparison of the numerical results obtained by the use of the Reissner method and by the use of the Biot method, for the two-dimensional theory of the oscillating wings of finite aspect ratio. From the development of the two methods it is clear that, of the two, the Reissner method would give more accurate results. However, because of the additional simplifying assumptions that were made in the development of the Biot methods, the Biot procedure is simpler to apply. In comparison with the Reissner results, the loss of accuracy inherent in the Biot method is small enough so that in practical applications, it is possible to use the Biot method and take advantage of its numerical simplicity. AAF TR 102-AC 49/9-100.

RB-50G AIRPLANE, ENGINEERING ACCEPTANCE INSPECTION, by Fred R. Heckerman. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Mar 1951. 3p Mi $1.25, Ph $1.25. PB 103239

1. Airplanes - Inspection 2. RB-50G (Airplane) 3. Boeing Aircraft Company, Seattle, Wash. 4. AAF TSEAA MR S2-4.

Memorandum report MCREXD-S2-4.

SKOLZHENIE KRYLA V VYAZKOM I SZHIMAEMOM GAZE. (SIDESLIP IN A VISCOUS COMPRESSIBLE GAS), by V. V. Struminsky. Apr 1951. 8p Mi $1.25, Ph $1.25. PB 103364

By an analysis of the Navier-Stokes equations it is shown that the aerodynamic coefficients of an infinite rectangular swept wing in an isothermal or adiabatic flow of a compressible gas can be determined from the aero-dynamic coefficients of the unswept wing. When the flow is neither isothermal nor adiabatic, a three-dimensional boundary layer theory is developed and applied to the special case of a swept flat plate. Translation from Doklady Akademii Nauk, T. LIV, no. 9, 1946. NACA TM 1276.

SOME THEORETICAL CHARACTERISTICS OF TRAPEZOIDAL WINGS IN SUPERSONIC FLOW AND A COMPARISON OF SEVERAL WING-FLAP COMBINATIONS, by Robert O. Piland. U. S. National Advisory Committee for Aeronautics. Apr 1951. 26p diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 103399

The theoretical lift and pitching moment due to angle of attack and pitching and the lateral force and yawing moment due to rolling of a trapezoidal wing are derived. The equations are applicable when the

inboard Mach line from a leading-edge tip intersects the trailing edge and the outboard Mach line lies ahead of the side edge. When the side edges are raked in, the former condition is sufficient. A comparison based on theoretical expressions of the lift and rolling effectiveness for half-delta tip (point forward) and trailing-edge flaps on various plan forms is made. NACA TN 2336.

SOPROTIVLENIE STRELOVIDNOGO KRYLA PRI SVERKHZVUKOVYKH SKOROSTIAKH (RESISTANCE OF A DELTA WING IN A SUPERSONIC FLOW), by E. A. Karpovich and F. I. Frankl. Apr 1951. 6p diagrs Mi $1.25, Ph $1.25. PB 103363

The resistance of a delta wing at small angle of attack in supersonic conical flow with its leading edges within the Mach cone is calculated by a method that separates out the suction force. Translation form Prikaldnaya matematika i mekhanika, Vol. XI, no. 4, 1947. NACA TM 1283.

SPIN-TUNNEL INVESTIGATION OF THE EFFECTS OF MASS AND DIMENSIONAL VARIATIONS ON THE SPINNING CHARACTERISTICS OF A LOW-WING SINGLE-VERTICAL-TAIL MODEL TYPICAL OF PERSONAL-OWNER AIRPLANES, by Walter. J. Klinar and Jack H. Wilson. U. S. National Advisory Committee for Aeronautics. May 1951. 126p photos, diagrs, drawings, tables Mi $5.00, Ph $16.25. PB 103602

This paper presents the results of a spin-tunnel investigation of a low-wing model typical of present-day four-place personal-owner airplanes to determine the effect of changes in loading, tail design, and wing shape on spin and recovery characteristics. Analysis of the data presented indicates some of the characteristics necessary for meeting present-day spinning requirements for personal-owner airplanes. NACA TN 2352.

STRUCTURAL DESIGN FOR THREE WINGS OF DIFFERENT SWEEPBACK, by Robert C. Noe. Jan 1949. 84p diagrs, graphs, tables Mi $3.75, Ph $11.25. PB 103582

A method is developed whereby wings of different degree of sweepback can be analyzed structurally and designed, using an analysis similar for all beams regardless of sweepback angle. Three wings of sweepback equal to 9^{o}, 20^{o}, and 40^{o} respectively were designed, and an analysis conducted. The change in beam weight due to sweepback also was examined. A method similar for all three beams was followed. Noted was a change in bending moment caused by the sweepback, as well as two factors tending to increase the moment and one tending to decrease the moment. It was found that the weight increase is due, not only to the change in length caused by the sweepback, but also to the change in plate thickness necessitated by the increased loads in the swept wings. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

SUPERSONIC LIFT AND PITCHING MOMENT OF THIN SWEPT-BACK TAPERED WINGS PRODUCED BY CONSTANT VERTICAL ACCELERATION. SUBSONIC LEADING EDGES AND SUPERSONIC TRAILING EDGES, by Frank S. Malvestuto, Jr., Dorothy M. Hoover. U. S. National Advisory Committee for Aeronautics. Mar 1951. 44p diagrs, graphs, tables Mi $2.50, Ph $6.25. PB 103360

Based upon time-dependent linearized supersonic flow, theoretical approximations to the lift C_{L_α} and pitching moment C_{m_α} produced by constant vertical accelerations were derived for a series of sweptback tapered wings with streamwise tips. The results are applicable for a range of Mach number for which the wing is wholly contained between the Mach cones springing from the nose and apex of the trailing edge of the wing. Design curves are presented which permit rapid estimations of C_{L_α} and C_{m_α} for given values of aspect ratio, taper ratio, Mach number, and leading-edge sweep. NACA TN 2315.

SURVEY OF METHODS FOR DETERMINING STABILITY PARAMETERS OF AN AIRPLANE FROM DYNAMIC FLIGHT MEASUREMENTS, by Harry Greenberg. U. S. National Advisory Committee for Aeronautics. Apr 1951. 49p diagr, graphs, tables Mi $2.50, Ph $6.25. PB 103545

A mathematical analysis of the problem of determinating stability parameters from dynamic flight measurements is made. Various available methods of obtaining a first-order approximation to these parameters are illustrated. The application of the method of least squares to compute these parameters is discussed. NACA TN 2340.

TRANSIENT AERODYNAMIC BEHAVIOR OF AN AIRFOIL DUE TO DIFFERENT ARBITRARY MODES OF NONSTATIONARY MOTIONS IN A SUPERSONIC FLOW, by Chieh-Chien Chang. U. S. National Advisory Committee for Aeronautics. Apr 1951. 65p graphs, tables Mi $3.00, Ph $8.75. PB 103367

Investigation is made of the transient behavior of an airfoil in supersonic flow due to pitching, flapping, and vertical gusts by means of the Fourier integral method. By using a convolution integral, the aerodynamic effect of any arbitrary motion of the airfoil can be determined, if the aerodynamic response of the airfoil to a step-function disturbance is known. As useful examples, the harmonically oscillating airfoil with different modes or degrees of freedom is analyzed for the complete time history, for the case in which the motion starts abruptly from rest. In carrying out the investigation, a new integral has been introduced which is believed to play an equivalent part in supersonic flutter to the Theodorsen function in the flutter problems of incompressible flow. NACA TN 2333.

WATER-LANDING INVESTIGATION OF A MODEL HAVING HEAVY BEAM LOADINGS AND 0^{o} ANGLE OF DEAD RISE, by A. Ethelda McArver. U. S. National Advisory Committee for Aeronautics. Apr 1951. 18p diagr, graphs, table Mi $1.75, Ph $2.50. PB 103542

Tests were made in the Langley impact basin to obtain experimental data from smooth-water landing tests of a model having a 0^{o} angle of dead rise and beam-loading coefficients of 18.8 and 36.5. The results include plots showing the effect of flight-path angle at water contact and trim upon load, draft, pitching moment, and time to reach various stages of immersion. NACA TN 2330.

WIND TUNNEL INTERFERENCE DUE TO LIFT FOR DELTA WINGS OF SMALL ASPECT RATIO, by Sine B. Berndt. Sweden. Kingl. Tekniska Högskolan. Institutionen for Flygteknik. Sep 1950. 11p diagrs, graphs Mi $1.75, Ph $2.50. PB 103149

Using the method of R. T. Jones for calculating the

air loading on wings of small aspect ratio, the wind tunnel interference due to lift for delta wings at small angles of attack and zero yaw has been investigated. The results are presented as correction factors of conventional type from which the corrections to measured values of angle of attack, drag and pitching moment, at given lift, can be calculated. Numerical application to closed rectangular test sections shows that the corrections differ not very much from those obtained by lifting line theory. Technical notes no. 19. KTH AERO TN 19.

Instruments

DESIGN OF A GROUND POSITION INDICATOR FOR AIRCRAFT, by John Lovell. May 1949. 28p photos, diagrs Mi $2.00, Ph $3.75. PB 103644

A position indicator based on gyroscopic principles has been designed which will provide the pilot or navigator with a continuous indication of the latitude and longitude of the aircraft, independent of radio aids or knowledge of wind vector. The importance and history of position indicator development is briefly discussed. Basic principles involved in the use of free and controlled gyroscopes in position indicators are explained and theoretical aspects of the indicator design are given, including descriptions of the components of the stabilized reference platform and the indicators. Further studies are recommended for improving the accuracy of the pickoff system and for improving directional control. Thesis-Rennselaer Polytechnic Institute, Troy, N. Y.

DEVELOPMENT OF A FUEL FLOW TRANSMITTER TESTING INDICATOR, by Zavan Narzakian and J. Vaccaro, Jr. U. S. Naval Air Material Center. Aeronautical Instruments Laboratory, Philadelphia, Pa. Jun 1949. 35p photos, diagrs, tables Mi $2.25, Ph $5.00. PB 103583

A fuel-flow transmitter testing indicator was developed for use in Naval overhaul depots to test the accuracy of aircraft-type fuel-flow meters using fluids of various weights and viscosities. Detailed descriptions are given of the test stand, fuel tank, filter, fuel pumps, and flowmeters, and a procedure for conducting a calibration test on a service type flowmeter is outlined. Three indicators were constructed to cover ranges from 25 to 250 PPH, from 100 to 2000 PPH, and from 800 to 8000 PPH. Proposed specifications for the fuel flowmeter test stand are included. BuAER project: TED NAM MA-321. NAES AIL 36-49.

FLIGHT TESTS ON A FALCON WITH SPOILER LATERAL CONTROL, by C. E. Kerr. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Dec 1941. 8p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 103146

1. Control surfaces, Lateral - Gt. Brit. 2. Spoilers, Circular-arc - Retractable - Gt. Brit. 3. Falcon (Airplane) 4. ARC RM 2491.

Cover date is 1950. S. O. Code 23-2491.

IMPROVEMENTS IN GLIDE PATH TRANSMITTERS, by C. H. Jackson. U. S. Civil Aeronautics Administration. Radio Development Division, Indianapolis, Ind. Apr 1949. 15p photos, diagrs, graphs Mi $1.75, Ph $2.50. PB 103479

A description is given of a glide path transmitter which is part of the CAA instrument landing system. It operates in the frequency region of 335 megacycles The transmitter employs type 8025 tubes in the tripler and power amplifier stages. After numerous tests it was decided to redesign the transmitter and change to type 2C39 tubes. Further development at the Experimental Station has resulted in extending the tube life expectancy of the 2C39 tubes to 6000 hours. Some of the modifications made at the Experimental Station are discussed herein and a graphical analysis of the operation of the amplifier is given. Includes Appendix 1. CAA TDR 91.

PRELIMINARY DEVELOPMENT OF A NEW TECHNIQUE FOR PRECISION MEASUREMENT OF VERY SLOW AIRSPEEDS, by Edward H. Flack. Jun 1949. 40p photos, diagrs, graphs Mi $2.25, Ph $5.00. PB 103500

The limit of accuracy of the pitot tube micromanometer combination for measuring slow air speeds was investigated for the purpose of developing a new and better method. From experimental evidence it was found that the accuracy of the pitot-static tubes is poor in measuring slow airspeeds, due primarily to the viscosity of air. It may also be concluded that the method presented for measuring $\frac{\Delta s}{\Delta t}$ is physically sound and mechanically possible. Results show very accurate measurement of Δs and Δt which require only one simple mathematical calculation to obtain air speed. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

WIND-TUNNEL INVESTIGATION OF A NUMBER OF TOTAL-PRESSURE TUBES AT HIGH ANGLES OF ATTACK, SUBSONIC SPEEDS, by William Gracey, William Letko, and Walter R. Russell. U. S. National Advisory Committee for Aeronautics. Apr 1951. 60p photos, drawing, graphs, tables Mi $2.75, Ph $7.50. PB 103365

Calibrations of 39 total-pressure tubes for an angle-of-attack range of $\pm 45^{\circ}$ and an indicated airspeed of 195 miles per hour are presented. The configurations of the various tubes differed as regards external shape, internal shape, and type of total-pressure entry. External shapes tested included cylindrical-, conical-, and ogival-nose sections. Internal shapes and total-pressure entries were varied on the basis of such factors as size of impact opening, leading-edge sharpness, chamber shape, internal bevel, slant profile, and shielding (combined with venting). The effect of these design variables on the sensitivity of the tubes to angle of attack is discussed. NACA TN 2331.

Engines and Propellers

CALCUL EN FLEXION DE PALES DE GIRAVIONS. (CALCULATION OF THE BENDING STRESSES IN HELICOPTER ROTOR BLADES), by P. de Guillenchmidt. Mar 1951. 32p diagrs, graphs Mi $2.25, Ph $5.00. PB 103362

A comparatively rapid method is presented for determining theoretically the bending stresses of helicopter rotor blades in forward flight. The method is based on the analysis of the properties of a vibrating beam, and its uniqueness lies in the simple solution of the differential equation which governs the motions of the bent blades. Translation from S.N.C.A.C. report, Document He3-0.03, December 23, 1948. NACA TM 1312.

CALIBRATION OF 7FT. O-IN. DIAMETER 4-BLADE HARTZELL WOOD TEST CLUB, DESIGN NO. B-894-24B, HUB DESIGN 40G 3026, FOR POWER RATINGS OF ALL SERIES R-1820 ENGINES. WHIRL TEST NO. 1479, by Harris D. Anderson. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1940. 10f graphs, tables Mi $1.25, Enl Pr $2.50. PB 103334

1. Propellers - Calibration 2. Propellers - Performance 3. Propellers - Tests 4. Propellers, Club 5. R-1820 (Engine) 6. AAF TR 4579.

CALIBRATION OF 8FT. 6-IN. DIAMETER, 4-BLADE HARTZELL WOOD TEST CLUB, DESIGN NO. B894-7A, HUB DESIGN 40C 3026 FOR POWER RATING OF THE V-1710-39 ENGINE. WHIRL TEST NO. 1478, by Harris D. Anderson. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1940. 11f graph, tables Mi $1.75, Enl Pr $3.75. PB 103333

1. Propellers - Calibration 2. Propellers - Performance 3. Propellers - Tests 4. Propellers, Club 5. V-1710-39 (Engine) 6. AAF TR 4581.

CALIBRATION OF GILLEN WOODWORK CORPORATION FOUR-BLADE TEST CLUB, A. C. DESIGN NO. 41 K-3929 FOR USE ON AN R-1820-45 ENGINE, by L. C. Gatewood. U. S. Air Materiel Command. Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1942. 12f graphs, tables Mi $1.75, Enl Pr $3.75. PB 103335

1. Propellers - Calibration 2. Propellers - Performance 3. Propellers - Tests 4. Propellers, Club 5. R-1820-45 (Engine) 6. AAF TR 4730.

CALIBRATION OF HARTZELL CLUB, DESIGN NO. 11'-6"x 25 AT VARIOUS DIAMETERS. WHIRL TEST NO. 1566, by L. C. Gatewood. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1942. 12f graph, table Mi $1.75, Enl Pr $3.75. PB 103336

1. Propellers, Wood 2. Propellers - Calibration 3. Propellers - Tests 4. Propellers - Performance 5. AAF TR 4756.

CONSIDERATIONS ON THE SELECTION OF THE MODE OF HEAT ADDITION TO A GAS FLOWING IN A PIPE, by R. Weatherston and J. V. Foa. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. May 1949. 26f drawing, diagr, graphs Mi $2.00, Enl Pr $5.00. PB 103407

A heating process evaluation from the standpoint of performance was made to determine the amount of heat addition which would be most economical in flow engines in which the heated mass flow is cooled by fresh air interposed between the walls and the heated flow. In an analytical model, the flow was subdivided into subflows separated from one another by baffles, producing any desired downstream velocity distribution of heat release across the heating section. The analysis showed that the entropy rise and the total pressure loss associated with the addition of heat to a flowing gas are always lower when all the heat is added to as small a portion of the flow as possible. The flow should, therefore, be divided into two streams by internal ducting so proportioned that the mixture therein is approximately stoichiometric, while the entire fuel flow is injected and burned in one stream only. Contract N6 ori-11912. CAL DB-805-A-1.

CONTRIBUTION TO THE THEORY AND PERFORMANCE OF RAM JETS, by Demetrios Samaras. National Research Council of Canada. 1948. 23p diagr, graphs Mi $2.00, Ph $3.75. PB 103649

Of the jet propulsion power plants, the ramjet seems to be the most promising for supersonic flight speeds. The gas dynamic processes that take place during the operation of such a power plant at subsonic and supersonic flight speeds are discussed, and the internal and external drag is examined as well as the process of heat addition by combustion. By the choice of suitable performance parameters, the performance of any ramjet may be found from three charts. From these charts, the following rules were drawn: At subsonic speeds, the overall pressure efficiency is more important than the combustion efficiency, while at supersonic speeds the opposite is true. The performance deteriorates rapidly with a slight decrease of the overall pressure efficiency at subsonic speeds; at supersonic speeds, slight deterioration results. In a simple ramjet three variable quantities are available for control, the fuel quantity, the inlet area and propelling nozzle area. Originally presented at the 6th International Congress of Applied Mathematics, Paris, Sep 1946 and subsequently brought up to date. Aeronautical report AR-3. NRCC 1674.

DEVELOPMENT OF LOW-DENSITY MATERIALS FOR USE IN FILLING HOLLOW PROPELLER BLADES. 9TH PROGRESS REPORT ON CONTRACT W33-038-AC-21105, NOV 14, 1948 TO FEB 15, 1949, by S. J. Stockett, C. L. Smith, W. J. Mueller, R. A. Clark and E. E. McSweeney. Battelle Memorial Institute, Columbus, Ohio. Mar 1949. 50f diagr, graphs, tables Mi $2.50, Enl Pr $7.50. PB 103395

Progress is reported on the development of low-density materials for use in filling hollow propeller blades in order to dampen vibrations and to strengthen the blades. During this period, studies were made with both cellular hard rubber and diisocynanate-alkyd resin-type foams. The results of these studies, and an account of the filling of the tip sections of three blades at the Propeller Division, Curtiss-Wright Corporation, are presented. For 10th (final) report see PB 103394.

DEVELOPMENT OF LOW-DENSITY MATERIALS FOR USE IN FILLING HOLLOW PROPELLER BLADES. FINAL (10TH) REPORT ON CONTRACT W33-038-AC-21105, MAY 1948 TO MAY 1949, by S. J. Stockett, C. L. Smith, W. J. Mueller, R. A. Clark, and E. E. McSweeney. Battelle Memorial Institute, Columbus, Ohio. May 1949. 82f diagr, tables Mi $3.75, Enl Pr $12.50. PB 103394

Final progress report covering the period from May 1948 to May 1949 deals with filling hollow propeller blades in order to dampen vibration to strengthen the blade. During this period of research on this project the compounding studies of cellular hard rubber were continued, but the emphasis of research on filler materials shifted to diisocyanate-alkyd resin-type foams, and an effort was made to utilize commercial-type alkyd resins. Although considerable information was obtained on the characteristics of different classes of commercial-type alkyd resins, none of those tried produced a foam with a thermal softening point higher than about 130°F, which is wholly inadequate. For 9th report see PB 103395.

DRAWING NO. 0158989: PROPELLER WHIRLING TEST RECORD, TEST NO. 1000, PROPELLER A.C. 29-3086, by D. A. Dickey and G. E. Brower. U. S. Army. Air Corps. Materiel Division, Wright Field, Dayton, Ohio. Nov 1929. 6p graphs, table Mi $1.25, Ph $1.25. PB 103730

1. Propellers - Tests.
Serial no. D.W.T.-1000. D 52/43/924.

E.D.A.C. FOUR-BLADE TEST CLUB X32N5441 CALIBRATED FROM 136" TO 92" DIAMETERS, WHIRL TEST NO. 1245, by Charles F. Phillips. U. S. Army. Air Corps. Materiel Division, Wright Field, Dayton, Ohio. Jan 1934. 22p graphs, tables Mi $2.00, Ph $3.75. PB 103732

1. Propellers - Tests 2. X32 N5441 (Propeller) 3. AAF TR 3917.
Doo. 12W3917.

FLUGMECHANIK DES STRAHLTRE IBWERKS. III: BETRIEBSVERHALTEN EINES STRAHLTREIBWERKS IN ABHÄNGIGKEIT VON DER FLUGHÖHE (FLIGHT PERFORMANCE OF A JET POWER PLANT. III: OPERATING CHARACTERISTICS OF A JET POWER PLANT AS A FUNCTION OF ALTITUDE), by F. Weinig. May 1951. 40p diagrs, graphs Mi $2.25, Ph $5.00. PB 103854

The performance of a jet power plant consisting of a compressor and a turbine is determined by the characteristics of the compressor and the turbine in relation to each other. The normal output, overload, and throttled load of the jet power plant are obtained on the basis of assumed straight-line characteristics. See PB 60812 for pt. IV. See also PB 96257. Translated from FB 1743/3, ZWB, Nov. 1, 1943 (Forschungsinstitut f. Kraftfahrwesen u. Fahrzeugmotoren, Tech. Hoch (Stuttgart). NACA TM 1258.

FOUR BLADE CLUB FOR J-6 ENGINE, DRAWING NO. 0169655, WHIRLING TEST NO. 1040, by D. Adam Dickey and F. O. Carroll. U. S. Army. Air Corps. Materiel Division, Wright Field, Dayton, Ohio. Jun 1930. 6p graphs, table Mi $1.25, Ph $1.25. PB 103731

1. J-6 (Engine) 2. Propellers - Tests.
Serial no. D.W.T.-1040. D 52.439/58.

HIGH PRESSURE FLEXIBLE HOSE AND END-FITTINGS FOR AIRCRAFT FUEL SYSTEMS (FIRE-RESISTANT AND NON-FIRE-RESISTANT) SPECIFICATION OF PARTICULAR REQUIREMENTS TO ACCOMPANY THE CONTRACT AGREEMENT. Gt. Brit. Ministry of Supply. Jan 1951. 14p drawings, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 103690

1. Engines, Aircraft - Fuel systems - Gt. Brit. 2. Hose, Fuel - High pressure - Gt. Brit. 3. MS DTD MS (R.D.I.) 3954.
Issue no. 1.

INVESTIGATION OF FLOW IN THE TIP REGION OF A PROPELLER, by Edwin L. Anning. Jun 1949. 44f photos, diagrs, graphs Mi $2.50, Enl Pr $7.50. PB 103428

An investigation was made of the flow pattern of a propeller operating in still air by measuring the velocity and direction of the flow in the neighborhood of the tips of the blades. A device for measuring the velocity and direction of air flow was constructed. The propeller was made of four blades. The speed of rotation was 2080 rpm and the blades were set an an angle of 25°. The flow converged very definitely as it approached the propeller and it left the propeller in a helical path which converged slightly for a short distance and then diverged. The angle of flow across the tip of the blade in the radial plane was approximately 62.5°, decreasing toward the propeller hub. The turbulence was greatest close to the propeller and toward the center. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

METHOD FOR CALCULATION OF RAM-JET PERFORMANCE, by John R. Henry and J. Buel Bennett. U. S. National Advisory Committee for Aeronautics. Jun 1951. 95p drawings, graphs, tables Mi $4.25, Ph $12.50. PB 104052

A method utilizing precalculated solutions graphically presented for calculating subsonic or supersonic ram-jet thrust coefficients and other important quantities is presented with the associated equations and graphs. Using the assumption of constant values of specific-heat ratio and gas constant equal to those of standard air, thrust-coefficient calculation has been reduced to a few simple operations. Correction methods are presented to account for variations in specific-heat ratio and gas constant. The correction to the thrust coefficient for a typical set of operating conditions may be of the order of 5 to 10 percent. NACA TN 2357.

RIEDEL STARTER RDA S/10. GERMAN REPORT NORBERT RIEDEL K. G. Mar-Nov 1945. 15f diagrs, graph Mi $1.75, Enl Pr $3.75. PB 103253

1. Engines, Aircraft - Starters - Germany 2. RDA S/10 (Starter) 3. Micro RTP/T2575.
M-450-46.

SERIES OF CALIBRATION TESTS ON A HARTZELL WOOD TEST CLUB, DESIGN NO. 0158991, FROM 4FT. DIAMETER TO 2FT. 8-IN. DIAMETER. WHIRL TEST NO. 1533, by Melvin Tanchel. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1941. 12f graphs, tables Mi $1.75, Enl Pr $3.75. PB 103332

1. Propellers - Calibration 2. Propellers - Performance 3. Propellers - Tests 4. Propellers, Club 5. AAF TR 4711.

STUDY OF THE FLUTTER PROBLEMS OF A HIGH SPEED PROPELLER BLADE, by Roy Fanti. Jun 1949. 109p diagrs, graphs, tables Mi $4.50, Ph $13.75. PB 103581

1. Propeller blades - Flutter 2. Ailerons - Flutter - Subsonic 3. Propeller theory 4. Airfoils, Rotating 5. Rensselaer Polytechnic Institute, Troy, N. Y.

TEMPERATURE SENSING ELEMENTS FOR AIRCRAFT GAS TURBINES, A DESIGN STUDY, by F. J. Larsen. Minneapolis-Honeywell Regulator Co. Research Division, Minneapolis, Minn. Mar 1949. 188f photos, drawings, diagrs, graphs, tables Mi $6.75, Enl Pr $25.00. PB 104193

Development work on resistance and optical temperature sensing devices for aircraft gas turbine is described. A resistance element has been designed which, for a period of 24 hr in a gas turbine, has withstood a temperature of 2200°F. An optical temperature sensing device has been constructed which can function as a temperature indicator and controller. Of the two systems, the resistance unit can

effectively function over a wider range of temperatures and is suggested as the logical device for gas-temperature measuring. However, if aircraft gas turbines operate at temperatures higher than those at which resistance elements of rhodium and platinum can be used, the optical device is recommended for sensing temperatures within the engine. As operating temperatures of future jet engines increase, peak radiation will shift to shorter wave lengths, making the optical device an even more effective instrument. MHR project AD 1991. Contract W33-038-ac-18298.

THEORETICAL COMPARISON OF SEVERAL METHODS OF THRUST AUGMENTATION FOR TURBOJET ENGINES, by Eldon W. Hall and E. Clinton Wilcox. U. S. National Advisory Committee for Aeronautics. 1950. 14p drawings, graphs Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $.20. PB 103603

A theoretical investigation of tail-pipe burning, water injection at the compressor inlet, combination tail-pipe burning plus water injection, bleedoff, and rocket-assist methods of thrust augmentation for turbojet engines was made for an engine representative of those in current use. The effect of augmented liquid ratio on augmented thrust ratio and the effects of altitude and flight Mach number on the performance of the various methods were determined. The additional take-off weight involved by the use of the different thrust augmentation methods, as well as the effect of the various thrust augmentation methods on the range of a representative aircraft, was also investigated. NACA Report 992.

TRIAL OF A TWIN LUBRICATION SYSTEM ON AN AIRCRAFT ENGINE, by George A. Roth and T. R. Salter. Texas. Engineering Experiment Station, College Station, Texas. Jan 1950. 22p drawings, tables Available from Texas. Engineering Experiment Station, College Station, Texas. PB 103674

An attempt has been made to determine the feasibility of a twin lubrication system on a four-cylinder opposed-type aircraft engine as a means of increasing reliability. Results indicate that an oil system with duplicate gear-type pumps, oil screens, check valves, oil pressure gauges, and two standpipes at different oil levels is practicable. Such an installation permits engine operation on either or both lubrication systems, and it indicates low oil supply whenever the oil level falls below a safe minimum. In addition, an oil tank filler neck baffle arrangement was tested which prevented dangerous loss of oil with the cap removed. It is concluded that the system with its adjuncts could prevent a substantial portion of the airplane accidents that result from faulty oil systems. TU EES RR 10.

WHIRL TEST NO. 1250: CALIBRATION OF FOUR-BLADED TEST CLUB OF DESIGN 33J2289 FOR LYCOMING YR-680 ENGINE, by Charles F. Phillips. U. S. Army. Air Corps. Materiel Division, Wright Field, Dayton, Ohio. Feb 1933. 5p graphs, tables Mi $1.25, Ph $1.25. PB 103733

1. Propellers - Tests 2. YR-680 (Engine) 3. 33-J2289 (Propeller) 4. AAF TR 3869.

Doo.12W3869.

WHIRL TEST NO. 1304: FOUR-BLADED TEST CLUB CALIBRATED FOR NAVY, by E. Harper. U. S. Army. Air Corps. Materiel Division, Wright Field, Dayton, Ohio. Jan 1935. 6p graph, table Mi $1.25, Ph $1.25. PB 103734

1. Propellers - Tests 2. AAF TR 4049.

Airports and Airways

STUDY OF RUNWAY MARKINGS, by S. J. Gerathewohl, H. Haber, Victor A. Byrnes, P. H. Ripple and W. M. Patterson. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jan 1951. 28p photos, drawings (1 fold), tables Mi $2.00, Ph $3.75. PB 103233

1. Runways - Markers 2. AAF SAM Proj 21-24-001, Report no. 4.

Formerly Project number 21-02-007.

Aerodynamics

AIR FLOW UNDER THE TOWING CARRIAGES IN THE R.A.E. SEAPLANE TANK, by K. M. Tomaszewski, S. Raymond and G. F. Chalmers. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jun 1946. 29p photos, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.00. PB 104081

Measurements have been made of the air flow under the two carriages in the R.A.E. Seaplane Tank with a screen or large flap set at varying attitudes at the rear of the working section. The flap was used in an attempt to reduce the air speed under the carriage to that of the carriage, so that investigations on the seaplane hull afterbody ventilation characteristics and interference between air flow and water flow could be made with the correct air flow round the model. By suitably adjusting the setting of the rear flap, it was found possible to obtain a mean air speed under either carriage the same as the carriage speed. The flap also served to stabilise the flow. Cover date is 1951. Technical note no. Aero. 1793. ARC CP no. 38. ARC TR 10010.

APPLICATION OF THE LIGHTHILL METHOD OF AIRFOIL DESIGN TO AN AIRFOIL WITH A FINITE TRAIL ANGLE, by Donald S. Sarris. Aug 1948. 32p graphs, tables Mi $2.25, Ph $5.00. PB 103485

The Lighthill method of airfoil design was applied to an airfoil with a finite trail angle. The resulting airfoil has a specified velocity distribution as a basis for design procedure and the technique was applied to an approximate Karman-Trefftz airfoil. This airfoil was selected because it possesses a finite trail angle as compared with the cusped Joukowski airfoils. The final result of the procedure is a direct result of log modifier chosen. A more favorable modifier might transform a Joukowski airfoil into a designed airfoil with a finite trail angle. With the given log modifier it was possible to design an airfoil with a favorable velocity distribution and a small but finite trail angle. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

APPROXIMATE CALCULATION OF TURBULENT BOUNDARY-LAYER DEVELOPMENT IN COMPRESSIBLE FLOW, by Maurice Tucker. U. S. National Advisory Committee for Aeronautics. Apr 1951. 42p graphs, tables Mi $2.50, Pn $6.25. PB 103368

Numerical solutions of quantities appearing in the Karman momentum equation for the development of a turbulent boundary layer in plane and in radial com-

pressible flows along thermally insulated surfaces are presented in tabular form for a range of Mach numbers from 0.100 to 10. Through use of these tables, approximate calculation of boundary-layer growth is reduced to routine arithmetic computation. The variation of local skin-friction coefficient with Mach number is obtained through the assumption that the Falkner relation for low-speed flat-plate friction coefficients is dependent only on Reynolds number provided that the fluid properties are evaluated at the arithmetic mean of the wall temperature and the stream temperature. NACA TN 2337.

APPROXIMATE METHOD FOR THE CALCULATION OF NON-STATIONARY AIR FORCES AT SUBSONIC SPEEDS, by Henry E. Fettis. U. S. Air Materiel Command. Office of Air Research, Wright-Patterson Air Force Base, Dayton, Ohio. Mar 1951. 91p tables Mi $4.25, Ph $12.50. PB 103875

The present report explains and illustrates a method of computing the non-stationary forces and moments on an oscillating airfoil at subsonic speeds. The process is based on the well known Possio integral equation relating the pressure on the airfoil to the normal velocity. Part I of the report contains the theoretical development which leads to the required equations for determining the lift and moment. In Part II the method of Part I is applied to the computation of the aerodynamic lift and moment coefficients for four principal degrees of freedom of the airfoil. The appendices contain the detailed mathematical deriviation of the various formulae involved in the problem. Contents: Part I. Statement of problem and method of solution. p. 1-11. - Part II. Results of numerical calculations. p. 13-26. AAF OAR TR 5.

COMPARISON OF THEORETICAL AND EXPERIMENTAL RESULTS FOR THE TURBULENT BOUNDARY LAYER IN SUPERSONIC FLOW ALONG A FLAT PLATE, by Carlo Ferrari. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Sep 1949. 36f graphs, table Mi $2.25, Enl Pr $6.25. PB 104196

Theoretical and experimental results are compared for the turbulent boundary layer in supersonic flow along a flat plate. On the basis of experimental results it is found necessary to restrict previously obtained theoretical data for the boundary layer arising from supersonic flow along a flat plate, placed parallel with the free-stream velocity vector, to an "inner' 'region. A different type of solution is formulated for the "outer" region of the boundary layer, the characteristics of which depend appreciably on the distance in the direction of flow. The theory now conforms with the experimentally determined fact that the drag coefficient decreases with increasing Mach. Problem Cal 1-A-4. CAL CM-562.

COMPRESSIBLE LAMINAR BOUNDARY LAYER OVER A FLAT PLATE WITH PARTIAL OR VARIABLE SUCTION AT THE WALL, by H. G. Lew. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics. Jun 1949. 21f graphs Mi $2.00, Enl Pr $5.00. PB 104216

The compressible laminar boundary layer over a porous flat plate with partial or variable suction was investigated. Approximate solutions were obtained by a modified Karman-Pohlhausen method. Relations for the characteristics of the flow as function of Mach number, the wall-to-free-stream temperature ration, and the suction velocity at the plate, were obtained for several distributions of suction velocity at the wall. The equations developed can be used to calculate the effect of any arbitrary distribution of suction velocity on the boundary layer by integrating a first order, non-linear, differential equation giving essentially the boundary thickness as a function of the distance along the plate. Contract N6ori-206, T. O. I, NR061-001. PIB AL R151.

EFFECT OF AN ARBITRARY SURFACE-TEMPERATURE VARIATION ALONG A FLAT PLATE ON THE CONVECTIVE HEAT TRANSFER IN AN INCOMPRESSIBLE TURBULENT BOUNDARY LAYER, by Morris W. Rubesin. U. S. National Advisory Committee for Aeronautics. Apr 1951. 37p graphs Mi $2.25, Ph $5.00. PB 103546

An analysis was performed to determine the effects on the rates of convective heat transfer produced by arbitrary variations of the surface temperature with distance along a flat plate. The analysis was confined to the case of a low-speed turbulent boundary layer on a flat plate oriented parallel to the free-stream velocity. It was found that a continuously variable surface temperature has, in general, a smaller effect on the local convective heat transfer than does a surface-temperature discontinuity. NACA TN 2345.

EXPERIMENTAL ANALYSIS OF THE CHANGES IN THE AERODYNAMIC CHARACTERISTICS OF A WING DUE TO THE ATTACHMENT OF WING TIP FUEL TANKS, by Carl H. Sells. Jun 1949. 42p photos, diagrs, graphs Mi $2.50, Ph $6.25. PB 103491

An experimental analysis was made of the changes in the aerodynamic characteristics of a wing due to the attachment of wing tip fuel tanks. The wing tip fuel tanks tested were mounted above, below, and symmetrically, on the tips of a rectangular planform wing. The tanks were mounted so that the overall span remained exactly the same, which resulted in the same aspect ratio for all the configurations tested. In every case the tip tanks resulted in an increase in drag and a decrease in lift. It was found that the tanks mounted on the tips symmetrically were the most efficient of the tanks tested. The tanks mounted above the tips proved to be the least desirable in the range of angles of attack used in the tests. Thesis-Rensselaer Polytechnic Institute, Troy N. Y.

EXPERIMENTAL INVESTIGATION OF LOCALIZED REGIONS OF LAMINAR-BOUNDARY-LAYER SEPARATION, by William J. Bursnall and Laurence K. Loftin, Jr. U. S. National Advisory Committee for Aeronautics. Apr 1951. 54p photo, diagrs, graphs, tables Mi $2.75, Ph $7.50. PB 103401

An experimental investigation of a localized region of laminar separation behind the position of minimum pressure on an NACA 663-018 airfoil section at zero angle of attack and some of the parameters which control such regions are described and discussed. NACA TN 2338.

EXPERIMENTAL INVESTIGATION OF THE EFFECT OF SURFACE HEATING ON BOUNDARY-LAYER TRANSITION ON A FLAT PLATE IN SUPERSONIC FLOW, by Robert W. Higgins and Constantine C. Pappas. U. S. National Advisory Committee for Aeronautics. Apr 1951. 29p drawing, graphs Mi $2.00, Ph $3.75. PB 103544

Boundary-layer transition has been studied on a heated flat plate in an air stream at a Mach number of 2.40 and a length Reynolds number range from 0.475×10^6 to 3.93×10^6. The transition region was investigated at nominal plate temperature levels of 60°, 100°, 140°, 180°, and 260° F and depicted in a series of curves of transition Reynolds numbers, based on boundary-layer dimensions and fluid properties evaluated alternatively at free-stream and wall temperatures. The average skin-friction coefficient over the laminar portion of the boundary layer was determined. NACA TN 2351.

FLOW THROUGH CASCADES IN TANDEM, by William E. Spraglin. U. S. National Advisory Committee for Aeronautics. Jun 1951. 44p diagrs Mi $2.50, Ph $6.25. PB 104243

An exact treatment of the problem of finding the incompressible, inviscid two-dimensional flow around two cascades in tandem is presented. The analysis includes solutions of both the direct and the inverse problems. These problems are solved by conformally mapping the tandem cascade onto the region between two concentric circles in which region there are suitable placed flow singularities. Formulas for the velocity and the potential in the annular region are presented in a closed form by means of elliptic functions. The equations are presented in a form suitable for computation. NACA TN 2393.

INFLUENCE OF THE INDUCED SIDEWIND ON THE EFFICIENCY OF THE VERTICAL TAIL, A SIMPLIFIED METHOD FOR CALCULATION, by Willi Jacobs. Flygtekniska Försöksanstalten (FFA) Stockholm. 1950. 31p diagrs, graphs, tables Mi $2.25, Ph $5.00. PB 104040

For certain airplanes in yaw, especially for high-wings and low-wings, a sidewind is induced, which is proportional to the angle of yaw β. This induced sidewind is of great influence on the efficiency of the vertical tail and is therefore important for the directional and lateral stability. In the following a method is described which makes it possible to calculate the induced sidewind in a simple manner. FFA no. 35.

LEAST-SQUARES CURVE-FITTING METHOD WITH APPLICATIONS TO THE CALCULATION OF STABILITY COEFFICIENTS FROM TRANSIENT-RESPONSE DATA, by Marvin Shinbrot. U. S. National Advisory Committee for Aeronautics. Apr 1951. 51p graphs, tables Mi $2.75, Ph $7.50. PB 103404

A least-squares method for calculating coefficients of a linear differential equation directly from transient-response data is presented. Examples illustrating the application of the method to the calculation of aircraft-stability parameters from the airplane response to an elevator deflection are given. NACA TN 2341.

MATRIX METHOD OF DETERMINING THE LONGITUDINAL-STABILITY COEFFICIENTS AND FREQUENCY RESPONSE OF AN AIRCRAFT FROM TRANSIENT FLIGHT DATA, by James J. Donegan and Henry A. Pearson. U. S. National Advisory Committee for Aeronautics. Jun 1951. 29p diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 104053

A method is presented for obtaining the over-all longitudinal-stability coefficients and frequency response of an aircraft from an analysis of arbitrary maneuvers in which simple instrumentation is used. Although the method presented deals entirely with the aircraft, it is equally applicable to other problems which can be expressed by second-order differential equations. NACA TN 2370.

METHOD FOR DETERMINING PRESSURE DROP OF MONATOMIC GASES FLOWING IN TURBULENT MOTION THROUGH CONSTANT-AREA PASSAGES WITH SIMULTANEOUS FRICTION AND HEAT ADDITION, by M. F. Valerino and R. B. Doyle. U. S. National Advisory Committee for Aeronautics. Apr 1951. 49p graphs (6 fold), tables Mi $2.50, Ph $6.25. PB 103405

A method involving the use of large-scale charts is developed that enables the convenient determination of the pressure drop sustained by monatomic gases flowing at high subsonic speeds in constant-area passages under the simultaneous influence of friction and heat addition. Although the charts are constructed for determining pressure drops when the heat is added at constant wall temperature, it is shown that, through the use of an effective wall temperature in conjunction with these charts, pressure drops can be determined with good accuracy for other modes of heat input. NACA TN 2328.

O PRIBLIZHENNOM RESHENII NEKOTORYKH ZADACH GIRODINAMIKI POGRANICHNOGO SLOYA. (METHOD OF SUCCESSIVE APPROXIMATIONS FOR THE SOLUTION OF CERTAIN PROBLEMS IN AERODYNAMIC), by M. E. Shvets. Apr 1951. 20p graphs Mi $1.75, Ph $2.50. PB 103579

A method of successive approximations for the solution of problems in the fields of diffusion, boundary-layer flow, and heat-transfer is illustrated by solving problems in each of these fields. In most of the examples, the approximate solutions are compared with known accurate solutions and the agreement is shown to be good. Translated from Prikladnaya matematika i mekhanika, vol. 13, no. 3, 1949. NACA TM 1286.

ON THE APPLICATION OF MATHIEU FUNCTIONS IN THE THEORY OF SUBSONIC COMPRESSIBLE FLOW PAST OSCILLATING AIRFOILS, by Eric Reissner. U. S. National Advisory Committee for Aeronautics. May 1951. 42p Mi $2.50, Ph $6.25. PB 103736

An account is given of explicit solutions in terms of Mathieu functions of the problem of two-dimensional subsonic compressible flow past oscillating airfoils. The results are applied to the calculation of three-dimensional corrections for the two-dimensional theory and the effect of the incorporation of the three-dimensional effects on the Mathieu function solution of the two-dimensional problem is shown. The developments are formal and must be supplemented by an appreciable amount of numerical calculations before the theory can be applied to specific problems. NACA TN 2363.

ON THE SECOND-ORDER TUNNEL-WALL-CONSTRICTION CORRECTIONS IN TWO-DIMENSIONAL COMPRESSIBLE FLOW, by E. B. Klunker and Keith C. Harder. U. S. National Advisory Committee for Aeronautics. Apr 1951. 33p graphs Mi $2.00, Ph $3.75. PB 103601

Solutions of the first- and second-order Prandtl-Busemann iteration equations are obtained for the flow past thin, sharp-nose, symmetric, two-dimensional bodies in closed channels. With the use of these solutions an expression is derived for the tunnel-wall interference. The tunnel-wall correction for a parabolic-arc airfoil is calculated to indicate the effects of compressibility, ratio of the tunnel height to the airfoil chord, and airfoil thickness coefficient. It appears that, for cases where the tunnel-wall corrections are significant, both the second-order effects and the variation of the correction along the chord should be considered. NACA TN 2350.

PLAN-FORM PARAMETER FOR CORRELATING CERTAIN AERODYNAMIC CHARACTERISTICS OF SWEPT WINGS, by Franklin W. Diederich. U. S. National Advisory Committee for Aeronautics. Apr 1951. 17p diagrs, graphs Mi $1.75, Ph $2.50. PB 103398

The finite-span effects on the lift-curve slope and the coefficient of damping in roll of swept wings in subsonic flow are shown to be functions primarily of a parameter which incorporates the aspect ratio, the sweep, and the section lift-curve slope. The limitations and possible uses of this parameter are discussed. NACA TN 2335.

SIMILARITY LAWS FOR HYPERSONIC FLOW, by Klaus Oswatitsch. Sweden. Kungl. Tekniska Högskolan. Institutionen for Flygteknik. Jul 1950. 12p diagrs, graphs Mi $1.75, Ph $2.50. PB 103148

The hypersonic flow condition is defined as the flow condition towards which the flow pattern tends as the free stream Mach number tends to infinity. Similarity laws for this region were first derived by Tsien. In the present report a different approach involving the shock wave equations is used. It is found that the pressure coefficients and lift forces are obtained, for hypersonic speeds, independent of the free stream Mach number and in the case of slender bodies, proportional to the square of the thickness ratio, in both plane and three dimensional flow. The lift of lifting surfaces is in the main proportional to the square of the angle of attack. A discussion of the importance of the Tsien similarity parameter is given. Technical notes no. 16. KTH AERO TN 16.

THEORETICAL ANALYSIS OF A SYMMETRICAL RING-TYPE AIRFOIL, by Nelson D. Flack. Jun 1949. 29p diagrs Mi $2.00, Ph $3.75. PB 103495

An analysis was made of the basic aerodynamic properties of the symmetrical ring-type airfoil, in which an attempt was made to evaluate expressions for lift and induced drag and to compare these quanities with those of other planforms. A ring airfoil of symmetrical cross section produces lift on the upper and lower halves of the ring; the lift and induced drag are compared with conventional airfoils. When the ring chord is much greater than the subscript for the ring airfoil, the lift becomes appreciably greater than the equation derived. The ring airfoil lift distribution varies elliptically. An elliptical planform having one quarter the ring airfoil area and spanning a diameter produces one half the ring airfoil lift and has the same ratio of lift to induced drag. Thesis-Rensselaer Polytechnic Institute, Troy, N. Y.

TRANSONIC FLOW PAST A WEDGE PROFILE WITH DETACHED BOW WAVE: GENERAL ANALYTICAL METHOD AND FINAL CALCULATED RESULTS, by Walter G. Vincenti and Cleo B. Wagoner. U. S. National Advisory Committee for Aeronautics. Apr 1951. 46p graphs Mi $2.50, Ph $6.25. PB 103366

Numerical calculations have been made of the characteristics at zero angle of attack of a thin, doubly symmetrical, double-wedge profile for the range of supersonic flight speeds in which the bow wave is detached. No special assumptions are made beyond those implicit in the small-disturbance theory of transonic flow. The following results are given as functions of the transonic similarity parameter: (1) shape and location of bow wave and sonic line, (2) chordwise Mach-number and pressure distribution, and (3) integrated pressure drag. The application of the drag results to an airfoil of specific thickness ratio is illustrated. NACA TN 2339.

Land Transportation

EFFECT OF BRAKE SHOE ACTION ON THERMAL CRACKING AND ON FAILURE OF WROUGHT STEEL RAILWAY CAR WHEELS. REPORT OF AN INVESTIGATION CONDUCTED BY THE ENGINEERING EXPERIMENT STATION, UNIVERSITY OF ILLINOIS IN COOPERATION WITH THE TECHNICAL BOARD OF THE WROUGHT STEEL WHEEL INDUSTRY, by Harry R. Wetenkamp, Omar M. Sidebottom, Horman J. Schrader. Illinois. University. Engineering Experiment Station, Urbana, Ill. Jun 1950. 103p photos, diagrs, graphs, tables Available from Engineering Experiment Station, University of Illinois, Urbana, Ill. $.60. PB 103551

1. Cars, Railroad - Wheels - Tests 2. Brakes, Wheel - Tests 3. Technical Board of the Wrought Steel Wheel Industry 4. ILU EES B387.

University of Illinois. Bulletin, v. 47, no. 77. Engineering Experiment Station, Bulletin series no. 387.

GROUND SAFETY METHODS FOR MOTOR POOLS, BY FRANK E. MANNING, HARRY J. OLDER, J. V. WAITS, EDNA E. STARK, M. D. HAVRON, J. H. HILL OF INSTITUTE FOR RESEARCH IN HUMAN RELATIONS UNDER CONTRACT AF 33(038)-12926. U. S. Air Force. Human Resources Research Laboratories, Bolling Air Force Base, Washington, D. C. Dec 1950. 57p tables Mi $2.75, Ph $7.50. PB 103791

1. Automobiles - Accidents 2. Safety devices and measures 3. Institute for Research in Human Relations 4. AAF HRRL 20.

Marine Transportation

SUBSURFACE WARFARE: HISTORY OF DIVISION 6, NDRC, by John Herrick. U. S. Research and Development Board. Jan 1951. 130p Mi $5.00, Ph $16.25. PB 103566

1. Submarine warfare - History 2. Submarines - History.

Prepared under the direction of John T. Tate, Chief, Division 6, NDRC (1942-1946). Issued for the Office of Scientific Research and Development.

VERGLEICH VON MODELLVERSUCHEN UND PROBEFAHRTEN BEI DEN R-BOOTEN. (COMPARISON BETWEEN MODEL TESTS AND TEST RUNS OF R-BOATS). Voith, J. M., Maschinenfabriken, Heidenheim, Ger. n.d. 37f graphs (Text in German) Mi $2.25, Enl Pr $6.25. PB 103821

1. Submarines - Models - Tests - Germany 2. Submarines - Performance tests - Germany 3. Micro NAVSHIPS S619-46.

Versuchsbericht 11376.

VIBRATION SURVEY OF THE USS MIDWAY (CVB 41) CONDUCTED DURING SHIP TRIALS OF JULY AND AUGUST 1947, by N. H. Jasper. U. S. David W. Taylor Model Basin, Carderock, Md. Mar 1948. 45p photos, graphs, tables Mi $2.50, Ph $6.25. PB 103353

A vibration survey was made jointly by several laboratories, principally to determine the vessel's vibration characteristics when operating with three-bladed and with four-bladed propellers. Design recommendations were to be made on the basis of the test results. The author concludes that three-bladed propellers are preferable in relation to their effect on machinery vibration but that four-bladed propellers are more desirable when hull vibrations are considered. Since the vibration amplitudes of Main Propulsion Units 1 and 4 are of acceptable magnitude when either type of propeller is installed, the author suggests that the vessel be operated with three-bladed propellers on the inboard shafts and four-bladed propellers on the outboard shafts. DWTMB no. 690.

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

GROUND-WATER SITUATION IN JAPAN, by M. L. Brashears. Supreme Commander for the Allied Powers. Natural Resources Section. May 1951. 44p photos, maps (1 fold), tables Mi $2.50, Ph $6.25. PB 104291

1. Water, Ground - Japan 2. SCAP NRS PS 51.

SURFACE WATER TREATMENT SYSTEM FOR THE RURAL HOME, by Joe B. Winston. Texas. Engineering Experiment Station, College Station, Texas. 1945. 43p diagrs, drawings, tables Available from Texas. Engineering Experiment Station, College Station, Tex. PB 103683

1. Water - Purification 2. TU EES B 89.

Agricultural and Mechanical College of Texas. Bulletin, ser. 5, v. 1, no. 15, Dec 1. 1945.

UEBER EINE NEUE METHODE DER BAKTERIOLOGISCHEN REINIGUNG DES MEERWASSERS. (ON A NEW METHOD OF BACTERIOLOGICAL PURIFICATION OF SEA WATER), by Martin Lundborg, Sören Lindhe und Östen Levin. Chalmers University of Technology, Gothenburg, Sweden. 1950. 24p photo, diagrs, graphs, tables (Text in German) Mi $2.00, Ph $3.75. PB 103186

1. Sea water - Purification - Germany 2. Sea water - Desalination - Germany 3. Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 99, 1950 4. Chalmers University of Technology, Gothenburg, Sweden. Institute for Silica Chemistry Research. Report no. 26.

Summary in English. Chalmers Tekniska Högskolas Handlingar no. 99. Institutionen för Silikatkemisk Forskning 26.

MISCELLANEOUS

ACCIDENTS: HOW THEY HAPPEN AND HOW TO PREVENT THEM. DESCRIPTIONS OF CERTAIN ACCIDENTS NOTIFIED TO H. M. INSPECTOR OF FACTORIES. Gt. Brit. Ministry of Labor and National Services. Factory Department. Oct 1950. 29p photos, drawings Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.25. PB 103221

1. Accidents, Industrial - Prevention - Gt. Brit.

Volume 5 (New series). Published quarterly. S.O. Code no. 72-21-5.

BREATHING ASSEMBLY, DEMAND, HIGH PRESSURE, SELF CONTAINED, by J. Donald Bowen. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1951. 6p graph Mi $1.25, Ph $1.25. PB 103236

1. Oxygen equipment 2. Chemox oxygen breathing apparatus 3. Respirators, Oxygen generating - Self contained 4. Scott Aviation Corporation, Lancaster, N. Y. 5. Mine Safety Appliances Company, Pittsburgh, Pa. 6. AAF TSEAA MR 666-16-L.

Memorandum report MCREXD-666-16-L.

COTTONSEED HULLS AS AN INSULATION MATERIAL, by W. E. Long. Texas. Engineering Experiment Station, College Station, Texas. Jul 1948. 11p drawings, graphs Available from Texas Engineering Experiment Station, College Station, Texas. PB 103671

1. Cottonseed hulls - Uses 2. Insulating materials - Cottonseed hulls 3. Cotton Research Committee of Texas 4. TU EES RR 2.

Cooperative investigation by Cotton Research Committee of Texas and the Texas Engineering Experiment Station of the Agricultural and Mechanical College of Texas.

DEVELOPMENT OF AGRICULTURAL COOPERATIVES IN JAPAN, by John L. Cooper. Supreme Commander for the Allied Powers. Natural Resources Section. Feb 1950. 53p tables Mi $2.75, Ph $7.50. PB 103338

1. Agricultural cooperative associations - Japan 2. SCAP NRS PS36.

ECONOMIC OUTLOOK SERVICE FOR AGRICULTURE IN JAPAN, by O. C. Stine. Supreme Commander for the Allied Powers. Natural Resources Section. Mar 1951. 25p tables Mi $2.00, Ph $3.75. PB 103468

1. Agricultural economics - Japan 2. Japan - Economic conditions 3. SCAP NRS PS 47.

PLANT BREEDING IN JAPAN, by E. G. Heyne. Supreme Commander for the Allied Powers. Natural Resources Section. May 1951. 32p maps Mi $2.25, Ph $5.00. PB 104292

1. Plant breeding - Research - Japan 2. Crops - Conservation - Japan 3. SCAP NRS PS 52.